



LORETO COLLEGE, KOLKATA

PERITIA
Vol-1, Issue-1 (May, 2025)

Peer-Reviewed e-Journal
Department of B.Ed, Loreto College, Kolkata.
Section: Content

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Editorial

Preparing Teachers for a World in Flux- Innovation, Equity and the Future of Teacher Education

PERITIA: The Journal of Teacher Education, is a premier research forum for teachers and B.Ed. trainee-students to actively engage in the preparation and support of teacher education. It is an interdisciplinary journal devoted to research findings on issues and concepts related to education and teacher education. This journal focuses on pedagogical research and improvement and innovations in teaching-learning processes to counter the commercializing perception of teaching as a profession. Some of the pressing issues are -Inducting teachers in meeting the marginalized youth, designing and assessing preparatory programs for teachers, influences of local and national policies in teacher education and accountability mechanisms within teacher preparation systems.

The field of teacher education is standing at the brink of big changes in designing programs. The global shifts due to technology, societal turbulence, and post-pandemic pedagogical transformation have laid newer and demanding challenges on teacher preparation programs. Therefore, the time for training-advanced teachers has passed; it is now necessary to create a system where these teachers can produce themselves as adaptable and innovative teachers possessed by a strong commitment to educational equity.

Today, teachers need the preparation to not only manage classrooms but to lead them. Teachers must address diverse student needs, apply pedagogically sound use of technology, and advocate for inclusive, culturally responsive instruction. Their classrooms today are the most diverse, digitally connected, and data-informed that there have ever been. However, many preparation programs still consider themselves to be working under the assumptions of the 20th century.

The present issue's research illustrates how important it is to rethink our ways. Simulation-based instructional studies, equity-focused curricula, and community-partnered sustainable practices—there is a lot of hope in these directions. One article describes how comprehension skills is enhanced through audiobooks which helps teachers prepare for the classroom, while another argues that engaging with the local community is helping to strengthen teachers' cultural awareness and social impact. This issue reflects on need of action research and interventions regarding issues emerging inside a classroom.

The question of living by the same principles ought to be a matter of introspection. We must ask difficult questions about whose voices are prioritized in teacher education, what historical inequities persist in our institutions, and how we can more equitably distribute opportunities for professional growth. Teacher educators have a moral imperative to lead with courage and clarity.

This journal continues to be conducive to such inquiry and prospective practice. Reading of this issue is a call to consider the future of teacher education. Let's transform our change agenda from one of incremental instituted reforms to a far-greatly differed and broader transformation sustained on evidence and social justice; one in which is premised on the idea that every child, in the world, is unique and deserves an excellent teacher.



SYSTEMATIC INTERVENTIONS TO IMPROVE HANDWRITING OF A MIDDLE SCHOOL LEARNER: A CASE STUDY

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Abstract

Handwriting is a skill immensely useful in academic as well as non-academic fields. Yet it's overlooked in the school going children. Even though it seems to be a fairly simple and natural skill, time devoted to improving writing skill and right posture while practicing handwriting play important roles. This study breaks down the skill of handwriting into its smallest units and charts the learner's progress as she improves on each of those smaller units. Through this study the researcher aims at studying the impact of administering repeated interventions at regular intervals of time, on the handwriting of the learner.

Keywords: Handwriting improvement, motor skill, child development, educational strategy, handwriting skill

INTRODUCTION

Good handwriting is a fundamental skill that holds immense importance in a student's educational journey. Firstly, clear and legible handwriting is essential for effective communication. Whether it is taking notes in class, completing assignments, or writing exams, having handwriting that others can easily read and understand is crucial. Illegible handwriting can lead to misinterpretations, misunderstandings, and even lower grades due to the inability of teachers and examiners to comprehend the content.

Furthermore, good handwriting promotes better cognitive development. The physical act of writing by hand engages multiple areas of the brain, including those responsible for motor skills, memory, and creativity. Research has shown that the process of forming letters and words by hand enhances neural connections and improves overall cognitive function. This, in turn, can positively impact learning abilities, memory retention, and critical thinking skills. In addition, having good handwriting fosters self-expression and self-confidence. When students can write neatly and legibly, they feel more confident in their ability to communicate their thoughts and ideas effectively. This confidence extends beyond the classroom, as good handwriting also plays a role in job applications, personal correspondence, and other real-world situations.

Moreover, good handwriting can contribute to better academic performance. Students with legible handwriting are more likely to receive higher grades on written assignments and examinations. Teachers can easily understand and evaluate their work, leading to fairer assessments. Additionally, neat and organized handwriting promotes better organization and structure in written work, enhancing the overall quality of the content. Lastly, good handwriting is a lifelong skill that extends beyond the academic realm.

While the digital age has brought about a shift towards typing and digital communication, the ability to write legibly and neatly remains an essential aspect of academic success. Handwriting not only serves as a means of communication but also plays a significant role in cognitive development, memory retention, and overall academic achievement. Thus it is necessary that good handwriting be cultivated among students from a young



and mouldable age where they can improve it with proper training. Teachers play a significant role in moulding the handwriting of students to the best of their abilities so that they are not only accepted but also admired for their clear and beautiful handwriting and communication. The teachers can also help students improve confidence in themselves and their writing skills along with developing a clear and organised conceptualisation of their work.

NEED OF THE STUDY

This research has been conducted to identify the exact problems that are hindering the child from improving her handwriting. The child here has difficulty in maintaining proper position of the arm and pencil grip. She also faces problems with formation of letters, word spacing and letter spacing. This action research aims at bringing about a positive change in the child through various interventions.

OBJECTIVES

This research has been conducted with the following objectives:

- to determine the type of problem the child is facing regarding her handwriting.
- to study the problem of bad and illegible handwriting among secondary school children.
- to recognize the pre-intervention status
- to analyse the relevance and effect of interventions in the post-intervention stage.

REVIEW OF LITERATURE

One way in which researchers have tried to understand the process of improving handwriting is by trying to identify the basic unit that comprises a motor program in handwriting. Because letters are often learned as a single unit, individual letters may be the basic element. It is also possible that single strokes, combinations of strokes, or even combinations of letters are the basic unit (Hulstijn and van Galen, 1983).

A study by van Galen and Teulings (1983) provides further support for the proposition that there are separate stages in the handwriting process, and that letter form (and its allographic variations) is activated independently of scale factors such as size and slant. Galen and Teulings found that the reaction time for writing the letter "h" was sequentially increased by reversing the execution pattern (retrieval of an abstract motor program), increasing size (setting parameters for the program), and changing the angle of vertical strokes relative to the baseline from normal to proclined to reclined to inverted (an anatomical factor in initiating the motor program).

Writers typically look at what they write as they compose, suggesting that handwriting benefits from vision (van Doorn and Keuss, 1993). Recent research has generally confirmed this observation, demonstrating that vision is an important, but not absolutely necessary, ingredient in handwriting control. When writing without vision, writing is slower as well as larger (van Doorn and Keuss, 1993; van Galen et al., 1989), more errors are made (Smyth and Silvers, 1987), alignment of words to the horizontal plane is more erratic (Smyth and Silvers, 1987), and habitual patterns for writing letters are simplified by reducing the number of pen lifts (Smyth, 1989).

In a study of the writing of 3- to 6-year-old children in France, Gombert and Fayol (1992) also found writing progressed from scribbling to refusals to write dictated text (level 6 in De Goes and Martlew, 1983), but they reported few instances of pictorial representations in children's writing. Although differences between the De Goes and Martlew (1983) and the Gombert and Fayol (1992) investigations, concerning the role of pictorial representation in writing development, may be due to the experimental tasks employed or even to cultural differences, a study by Dyson (1982) demonstrated that both writing and drawing are important ingredients in young children's early writing efforts.



Advice on posture, writing arm placement, and pencil grip are common in instructional materials on the teaching of handwriting. Children are encouraged to sit in an upright position, leaning forward slightly, with both forearms resting lightly on the desk and the elbows extended slightly. The hand is turned so that it rests on the third and fourth fingers. The pen is held between the thumb and the index finger, resting on the distal phalanx of the middle finger (tripod grip), about an inch above the point (Graham and Miller, 1980).

METHODOLOGY

SI is a student of class VI. The subject SI has been identified and selected for interventions due to a number of problems that could be observed in her sample of handwriting. She has poor letter formation and has difficulty properly shaping letters, leading to inconsistencies in size, slant and spacing. This lack of uniformity makes her written work appear messy and disorganized, making it harder for both the writer and the reader to follow the content. She capitalizes common nouns and other words in the middle of the sentence in order to place emphasis. Her letters are half-formed and squished together due to lack of proper planning. Often alphabets with a loop such as 'a' or 'd' tend to lose their shape. The student writes words which are disconnected making a single word appear to be two different words.

Intervention 1

The intervention was planned keeping in mind that the subject had difficulty making the proper strokes to form words. She was made to sit with the teacher trainee and given a worksheet. The teacher trainee made sure that the subject was comfortably seated and instructed to maintain an upright posture. The teacher trainee set a timer to measure how much time was required to complete a worksheet where she had to trace different strokes that are necessary in proper formation of alphabets.

Post Intervention Phase 1

The subject was able to trace the strokes but found it difficult to follow the lines due to her posture and position of arm. She was slow in following the curve of letters because she lacked confidence. The subject required 17 minutes to complete one worksheet. The next day she was made to sit with the teacher trainee and shown how to place her arm so that her posture would better facilitate writing.

Intervention 2

The intervention was planned keeping mind that the subject had difficulty in writing the capital form of letters in cursive writing. She was made to sit with the teacher trainee and given a worksheet. The teacher trainee set a timer to measure the time required to solve a worksheet where she had to copy out capital letters in cursive. The subject tried to maintain a good posture as she was taught. The position of her hand seemed to have improved.

Post Intervention Phase 2

The subject was able to write 12 letters of the alphabet properly at one go. The subject required 15 minutes to complete one worksheet. The next day the subject was made to sit with the teacher trainee where she was shown how to form the particular alphabets. The remaining letters required more than two attempts for her to perfect.

Intervention 3



The intervention was planned keeping in mind that the subject had difficulty in writing the small letters in cursive writing. She was made to sit with the teacher trainee where she was given a worksheet. The teacher trainee set a timer to measure the time required to solve a worksheet where she had to write small letters in cursive. The subject was focussed on improving the time she was taking to complete the worksheet.

Post Intervention Phase 3

The subject was able to write 18 letters of the alphabet properly at one go. The subject required 10 minutes to complete one worksheet. The next day the subject was made to sit with the teacher trainee where she was shown how to form the particular alphabets. The remaining letters required another attempt for her to perfect.

Intervention 4

The intervention was planned keeping mind that the subject had difficulty in writing whole sentences in cursive handwriting. She was made to sit with the teacher trainee where she was given a worksheet. The teacher trainee set a timer to measure the time required to solve a worksheet which had a few sentences in cursive. Short sentences with easy words were chosen so that the subject did not have to get distracted by complexity of words. She was given a worksheet with only three sentences so that she had enough time to focus on formation of the alphabets and letter spacing.

Post Intervention Phase 4

The subject was able to write all three sentences but faced difficulty in formation and spacing of letters in 6 words. The subject required 12 minutes to complete one worksheet. The next day the subject was made to sit with the teacher trainee where she was shown how to write those words properly in cursive.

Intervention 5

The intervention was planned keeping in mind that the subject had difficulty in writing whole sentences and capital letters in cursive handwriting. She was made to sit with the teacher trainee where she was given a worksheet. The teacher trainee set a timer to measure the time required to solve this particular worksheet. The worksheet had three sentences with slightly complex words. The subject showed improvement in positioning of hands.

Post Intervention Phase 5

The subject was able to write all three sentences but faced difficulty in formation and spacing of letters in 5 words. She required 10 minutes to complete one worksheet. She also did not cross all 't's and faced difficulty in spacing the letters of the words. The next day the subject was made to sit with the teacher trainee where she was shown how to write those words properly in cursive.

Intervention 6

The intervention was planned keeping in mind that the subject had difficulty in writing fully formed letters when the passage was dictated and no visual reference was provided. She was given the visual aid earlier, so that she could follow the curves of the letters and mimic them. Now that she showed improvement in letter formation, the visual aids were removed and a short passage was dictated to her. She was made to sit with the teacher trainee who dictated a small passage of 3 sentences and the subject was asked to write in cursive



employing all the techniques that were taught to her. A timer was set to measure how much time the whole activity required.

Post Intervention Phase 6

The subject was able to write all three sentences but faced difficulty in formation of letters in three words. She made sure to cross all 't's and the spacing of letters seem to have improved. She had an improved posture with better grip on the pen. She however required longer to complete this exercise because of the absence of visual cues. She required 15 minutes to complete the activity.

RESULTS AND DISCUSSION

The process of improvement of handwriting requires multiple factors and variables to be kept in mind while tracing the progress of the subject. One of those variables is the time taken to complete the worksheet or activity. The subject in the first intervention required 17 minutes to complete a worksheet. For the second intervention she required 15 minutes, 10 minutes for the third intervention, 12 minutes time for the fourth intervention, 10 minutes time for the fifth intervention and 15 minutes time for the sixth and last intervention. The time taken fluctuated with the difficulty level of the worksheet.

The subject however showed a steady improvement in her handwriting. In the first intervention, 16 letters of the alphabet were not formed properly and appeared to be squeezed together. In the second intervention it was 14 letters that were not formed correctly, in the third intervention it was 8 letters, in the fourth intervention it was 6 words, in the fifth intervention it was 5 words, in the last intervention it came down to 3 words.

LIMITATIONS

The research covered a majority of factors that determine one's handwriting but there are a few limitations to this study. The internal psychological factors of the subject was never taken into account. It has been proven across studies that mental state of a person highly affects their handwriting and body posture.

Secondly, the subject might have been affected by external factors which might have made her physically uncomfortable. There might be internal factors like hunger affecting her progress because most of the interventions were carried out during the lunch break.

Thirdly, the subject might need help to improve in some other domain of her skills for example time management. The interventions allowed her time to write very small portions of text. But in real life scenarios like exams the subject will not receive such flexibility.

Fourthly, not enough time was given to see proper improvement in handwriting keeping the time factor in mind. The study did indicate an improvement in handwriting but it offers no indication that the child will be able to maintain the newly gained skill when there is a time crunch.

Lastly, the subject's attitude towards schoolwork and learning in general was never measured. This factor can have a significant impact on her handwriting.

CONCLUSION

This study was a major learning experience for the teacher trainee because it provided an opportunity to work closely with a child and work towards identifying the problem and actively helping them in improving



themselves. The teacher trainee learnt a lot about how to identify a child who is facing problems in a classroom situation involving at least fifty other students. She also gained experience in researching topics and applying them to help benefit the subject. Even though multiple challenges like time constraint were there, the trainee was able to bring about a positive change in the child.

RECOMMENDATION

The subject can be given a set time for each activity to see if she can maintain the same handwriting even as she got lesser and lesser time. The subject can be counselled into understanding why she needs to improve her handwriting and made to realise how it will determine major events in her life like career and employment. Instead of giving multiple kinds of worksheets, the subject should be allowed to completely master one kind of worksheet, for example, Capital letters in English before moving on to a new kind, for example words in English.

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IMPACT OF COLONIAL AND MODERN DEVELOPMENT INITIATIVES ON FOREST SOCIETY AND ECOLOGY: A STUDY

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Abstract

The forest is a dynamic space representing a site for hunt, exile, hermitage and conquest all throughout history. It is an ecosystem in itself and harbours a biodiversity. The impact of development initiatives on forest society and ecology is a key area that needs attention. This paper makes a comparative analysis of the impact of these development initiatives on the realm of the forests both in colonial and present times. It studies the relevance of this topic in school curriculum and pedagogy. It analyses the topic from interdisciplinary perspectives and finds out the extent to which such environmental concerns are integrated in subject-teaching and the nature of interdisciplinary teaching in schools through a survey conducted for school teachers. Finally, the paper suggests measures to include this theme in school curriculum on the basis of data collected from survey conducted for students.

KEYWORDS: *Forest, development initiatives, comparative analysis, interdisciplinary, school curriculum, pedagogy.*

INTRODUCTION

The forest as a cultural space has always been central to Indian civilisation. It has been a site for exile, conquest, hunt as well as a zone of setting up hermitages all throughout ancient history. Further, the forest is the home and primary source of livelihood for the many women and tribal communities residing within it. During the pre-British days, these groups enjoyed their traditional rights over forests and forest products without hindrance. However, the nineteenth century witnessed major changes in forest society and ecology with the advent of colonialism. The various development projects resulted in the acquisition of forest land from the indigenous communities thus leading to forced displacement. Moreover, the cutting down of trees for extracting timber destroyed the rich biodiversity of the forests leading to deforestation. The concern is that these issues of displacement and ecological degradation have only become intense in present times. This paper analyses the impact of colonial and post-colonial development initiatives on forest society and ecology. The analysis is done by interrelating strands of history, environmentalism and gender studies.

NEED OF THE STUDY

The impact of development initiatives on forests is a global concern that needs attention. There has not been much research on the comparative aspects of the impact of colonial and modern development initiatives on forest society and ecology. Further, the need to include this theme in school curriculum has not been addressed by the existing literature. Thus, this paper stands necessary and relevant as it not only shows the importance of this theme in school curriculum and pedagogy but also argues for its inclusion on the basis of results gathered from surveys.

OBJECTIVES

1. To interpret the impact of colonial initiatives on forest societies and ecology.
2. To show how development in modern times means displacement for tribal communities and destruction for the environment.
3. To demonstrate the interdisciplinary nature of the study by establishing the interrelation between disciplines such as history, environmental science and gender studies.
4. To observe the relevance of the topic in school curriculum and pedagogy.
5. To suggest measures for the inclusion of the topic in school curriculum.

METHODOLOGY

The methodology is qualitative in nature. This paper is based on secondary data compiled from various books and journal articles. A survey has been conducted for school students to find out their overall awareness on the topic. Further, a survey has also been conducted for school teachers to find out whether such issues are integrated in their subject teaching and to explore the nature of interdisciplinary teaching- learning in school. The data collected from the surveys has been graphically represented.

REVIEW OF LITERATURE

Gadgil & Guha (1992) in *This Fissured Land: An Ecological History of India* has critically analysed the link between colonialism and environmental degradation. The historians consider colonial forestry as an ecological watershed in India. They conclude that the state takeover of forest lands led to the curtailment of customary rights as well as ecological decline. Shiva (1989) in *Staying alive: Women, Ecology and Development* found a new dimension to relate the concern of ecology with gender issues. She shows women as the victims of modern science and development. The main argument presented here is that women's subsistence economy based on the forest was replaced by the commercial economy of the British, thus impacting their economic interests. Skaria (1999) in *Hybrid histories: Forests, frontiers and Wildness in Western India* discusses the colonial perceptions of forests. The author observes that forests were perceived as an untamed, wild and unproductive space in colonial times. Colonial forestry, as the author puts it, would often last as a project of taming wildness and civilising it. Saravanan (2003) in *Colonial commercial forest policy and tribal private forests in Madras presidency: 1792-1881*, highlights the colonial forest policy vis a vis the tribal private forests in the Madras Presidency during the late eighteenth and early nineteenth centuries. The author argues that colonial intervention in these forests led to the common property and occupation rights of the tribals being usurped. Thaha (2009) in *Forest policy and Ecological*



Change: Hyderabad state in Colonial India has done an in-depth analysis of the impact of colonial forest policy on the Hyderabad state forests. He contends that the Hyderabad forests under British control witnessed a transition from being a property of people to being the property of state. The author's extensive use of twentieth century newspaper reports reveal that the people were living in a miserable condition due to the denial of access to natural resources. Rangarajan (2006) in *Environmental issues in India*, analyses colonial forest policy and discusses the social impact of colonial forestry. Further, the work also draws a connection to the present times and shows that how modern development such as dams and mines entail denudation of forest land and displacement of people. The historian concludes that ecological costs of colonialism are evident to this day. Haeuber (1993) in *Development and Deforestation: Indian Forestry in Perspective* describes the ecological implications of the development policies of post-colonial India. The central argument presented by the author is that ecological issues such as deforestation have become intense in post-independent India and that in itself is a legacy of colonialism. The author agrees that Indian forests are required for raw material generation and fulfilment of industrial demand. However, he contends that in the pursuit of these demands, little or no attention is paid to the needs of the rural population and their access to forest products is curtailed. Kothari (1996) in *Whose Nation?* The displaced as victims of development contends that 'development' in present times does not mean progress for all sections of the society and is not compatible with the goals of creating equity and social security. The author shows that how the resettlement of those displaced by development projects has been minimal. Singh (2020) in *Development induced displacement: Issues and Indian experiences* shows the impact of developmental initiatives in present times. The author argues that in the name of 'national interest', many people have been displaced from their habitat and their needs have been overlooked by the state. Guha (2013) in *Development or Destruction* shows the social and environmental costs of development projects undertaken in post-independent India. Ramachandra Guha discusses the impact of construction of mega dams in the Narmada Valley on local livelihoods, arguing that it led to large scale displacement. This paper stands different from the existing literature as it makes a comparative analysis of the impact of development initiatives on forest society and ecology in colonial and contemporary times. The existing literature does not mention the need to include this theme in the school curriculum. Thus, to focus on this area, a survey has been conducted for school students to find out their overall awareness on the topic. Further, a survey has also been conducted for school teachers to find out whether such issues are integrated in their subject-teaching, to explore the nature of interdisciplinary teaching-learning in school and its relevance in pedagogy. Suggestions have accordingly been made for the inclusion of this theme in the school curriculum. This paper builds and works upon these areas as these have not been explored by the present literature.

RESULTS AND DISCUSSION

The research brings to light the local histories of indigenous forest communities under colonial rule. It shows the interrelation between history and environmentalism. Further, a comparative analysis of the impact of colonial and contemporary development projects on the realm of forests reveals some interesting facets. The colonial inroad into the interiors of the forest was driven both by political and economic objectives. The destruction of forests was often meant to symbolise political victory. Further, clearing of forest lands was often justified as a project



of removing 'wildness' and bringing about 'civilisation' and order. The economic objectives included timber extraction for railway construction and expansion of cultivable land. The focus was often on exploiting natural resources without considering long-term sustainability.

In the present times, human activities continue to impact forests but with different drivers. The contemporary pressures on forests often result from population growth, consumer demands and globalised markets. The available statistics reveal that development in modern times in the form of mega-projects still spells out forced displacement for indigenous communities and environmental degradation. Moreover, a number of indigenous people who have been evicted from forests have not yet been provided any rehabilitation help from the government. For instance, more than 520 Garo indigenous people who were evicted from the Lumding Reserve Forest in Assam in November 2021 did not receive support from state government for rehabilitation. The present scenario also reveals that with economic development comes a growing level of ecological insecurity. Many deforestation alerts have been reported in India as a result of urbanisation, infrastructure development and industrial activities. Also, today's approach to forest management incorporates sustainability and conservation more effectively than colonial times. However, challenges persist even today and despite acts guaranteeing the right of indigenous people, displacement is in common practise.

This topic stands of great relevance to be included in the school curriculum. The school curriculum only provides an outline of colonial forest policy and its ramifications on indigenous societies. For instance, the CBSE curriculum of history of class 9 focuses on the rise of commercial forest policy, the varied motivations behind it, its impact on livelihoods and the emergence of forest rebellion. The curriculum does not connect these colonial initiatives with contemporary developmental initiatives that are leading to displacement of many forest communities. This theme of present-day development and its impact on the domain of forest must be included in the curriculum to help the child connect the chapter to real-life examples and think critically.

A survey was conducted of students studying in different boards from classes IX to XII to discern their awareness on the impact of current development initiatives on forests. The survey received a total of 27 responses. As per [Figure 1](#), it can be observed that 59% of the students are not well aware about the topic. Further, 41% of the students have responded that the curriculum does not integrate environmental issues pertaining to the forests (shown in [Figure 3](#)). Moreover, [Figure 4](#) illustrates an agreement among 63% of the respondents that the curriculum must be updated to include this theme so as to make them aware of recent case studies of development impacting forests. The survey results also brought to light students' opinion on the role of educational institutions in improving awareness about development projects impacting forests in present day scenario. The students suggested that the topic must be integrated in lessons. Also, seminars and workshops must be organised on forest conservation. Further, suggestions were made as to how schools should encourage hands-on activities, field trips as well as student led initiatives such as tree-planting programs to engage students in understanding and addressing the impact of development projects on forests.

This paper also shows the interdisciplinary nature of the topic by correlating subjects such as history, environmental science, economics, geography and economics. It shows the historical



evolution of colonial forest policy that laid the foundation for contemporary ecological challenges. It also highlights the economic motives behind both colonial and modern initiatives such as timber trade and industrialisation. Geography as a subject becomes integrated in this study when one analyses the impact of development initiatives on landscapes such as forests and studies patterns of deforestation and habitat loss. Further, environmental science is intrinsically connected with the topic as the paper has analysed the ecological consequences of developmental initiatives and stressed the need for more sustainable practices. The interrelation of different academic disciplines makes this study interdisciplinary in nature.

In this light, a survey was conducted for school teachers to know whether such environmental concerns are integrated in their subject-teaching and to explore the overall nature of interdisciplinary teaching-learning in schools. The questionnaire was responded by 14 teachers across different subjects. From [Figure 5](#), it can be observed that 93% of the respondents do correlate concepts from different subjects in the teaching-learning process. Further, 71% of the respondents mentioned that their subject does integrate environmental concerns to some extent (shown in [Figure 8](#)) and that the curriculum encourages student participation in field trips and hands on activities. The responses showed an agreement among teachers that interdisciplinary teaching is effective in enhancing students' understanding (shown in [Figure 6](#)) and helping them make cross-curricular connections (as observed in [Figure 7](#)). Moreover, [Figure 11](#) illustrates that 63% of the teachers find interdisciplinary teaching effective in increasing student engagement on a topic and help them connect their theory to real-world examples and go 'beyond the curriculum' (shown in [Figure 12](#)). Teachers also opined that interdisciplinary teaching-learning would be an intrinsic part of near future's classrooms keeping in mind the National Educational Policy, 2020. It would enable themselves as teachers to be more creative in their approach, stay updated with different disciplines and work collaboratively with teachers across all disciplines to enhance the quality of education.

Further, an enriching discussion with the teacher-trainees brought forth their perspectives on the topic. Most of them held that the topic holds vital importance as a global concern as the forest is not only a bare land but an ecosystem in its whole. They agreed on the necessity to make children aware of the importance of sustainable development and the seventeen sustainable development goals that have been adopted by the United Nations as part of its 2030 agenda for ensuring sustainable development. For this, the teacher trainees suggested various activities that could be incorporated in the pedagogical approach to instil environmental awareness in students. This includes day-to-day activities such as practising eco-friendly gardening in school, gifting of seeds and making constructive products out of recyclable materials. It was further suggested that a teacher could use 3D Models or a globe to show the extent of the forest cover that has been denuded. These activities, the teacher-trainees held, would make students aware of the viable day to day alternatives that can be adopted to conserve the environment.

A Graphical Representation of Survey Results

Survey for School Students

A survey was conducted for school students to find out their awareness on the impact of current development initiatives on forest society and ecology. The survey results have been represented in a graphical form whereby X axis represents the survey response options and Y axis shows the percentage of students who have responded.

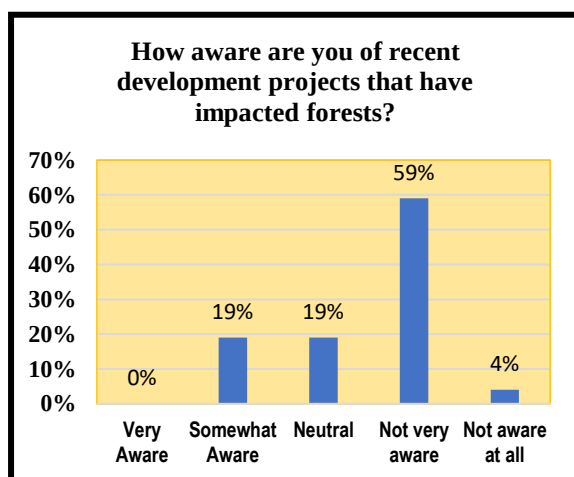


Figure 1

This graph illustrates students' awareness on the topic.

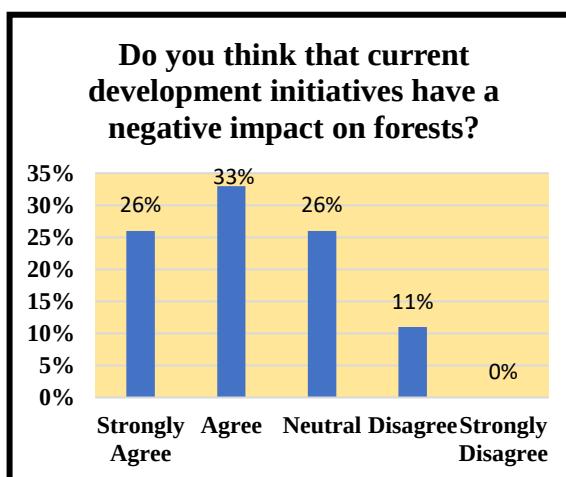


Figure 2

Students' response on the impact of development on forests.

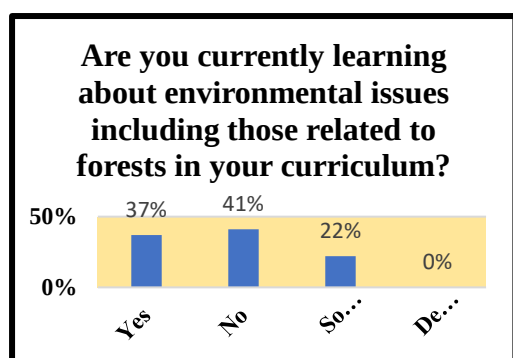


Figure 3

Environmental education in curriculum.

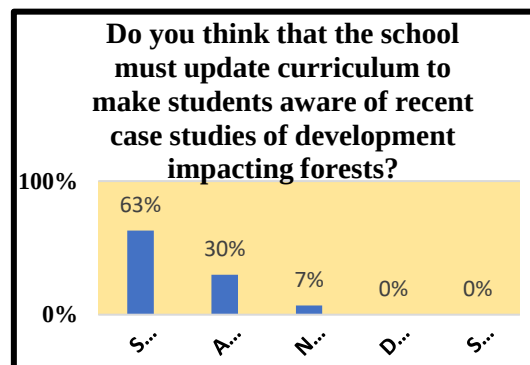


Figure 4

Consensus on the need to update school curriculum.

Survey for teachers

A survey was conducted for school teachers to find out whether environmental concerns are integrated in their subject-teaching, to explore the nature of interdisciplinary teaching-learning in schools and its relevance in pedagogy. The results obtained from the survey have been graphically represented whereby X axis represents the survey response options and Y axis shows the percentage of teachers who have responded.

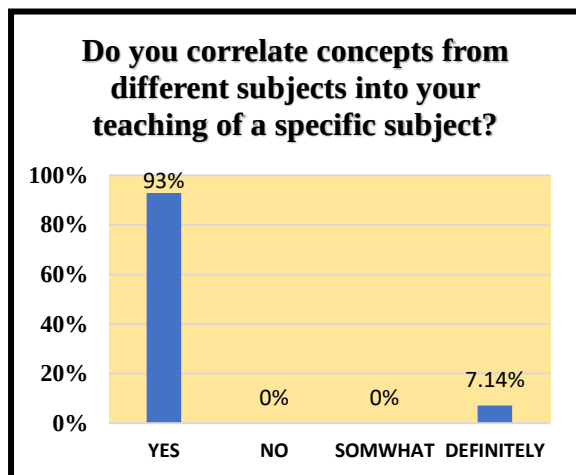


Figure 5

Correlation of subjects in teaching-learning.

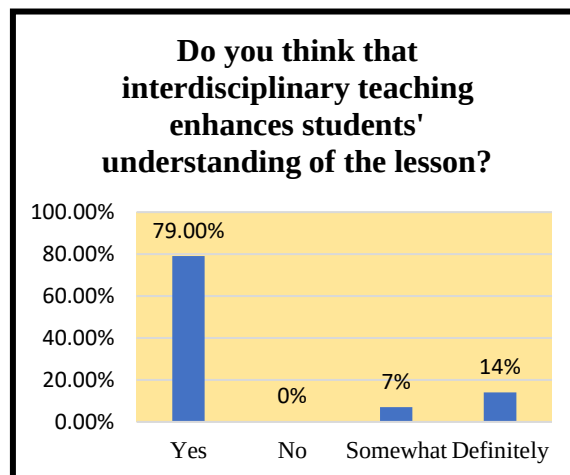


Figure 6

The Role of Interdisciplinary Teaching on Student Understanding.

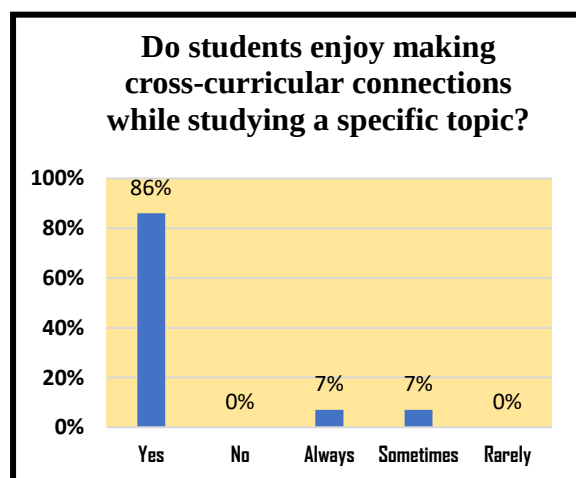


Figure 7

Relevance of cross-curricular connections in learning.

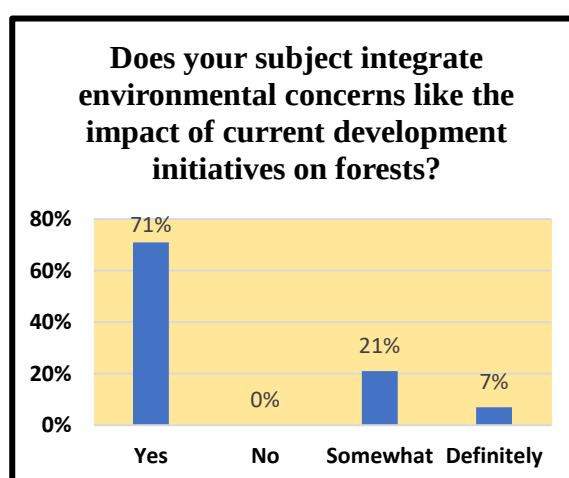


Figure 8

Integration of environmental concerns in subject-teaching.

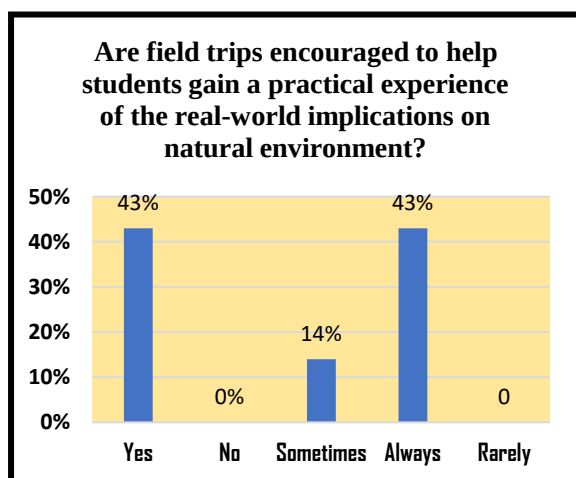


Figure 9

Response on encouragement of field trips in schools.

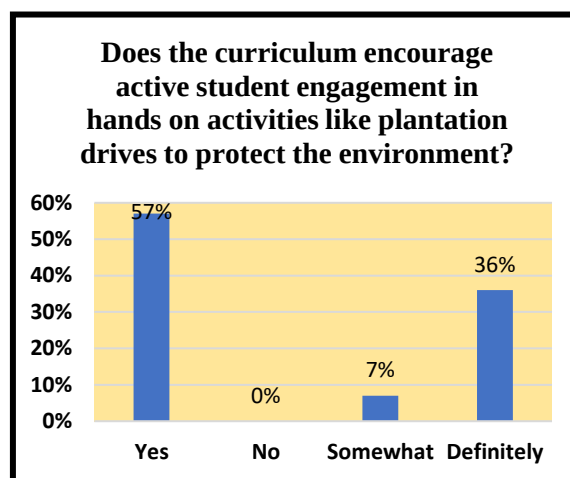


Figure 10

Integration of eco-friendly hands-on activities in the curriculum.

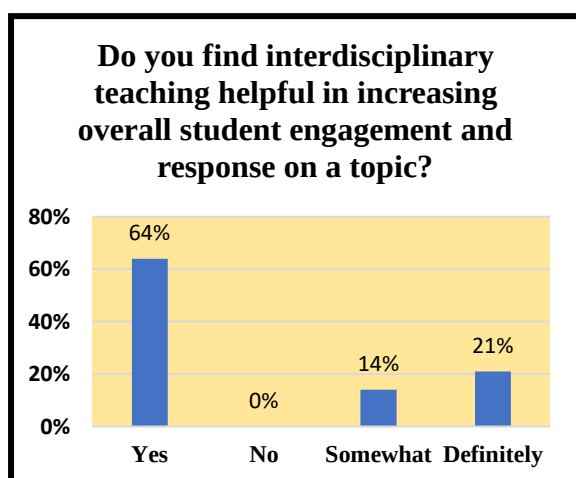


Figure 11

Student Engagement in Interdisciplinary Learning Environments.

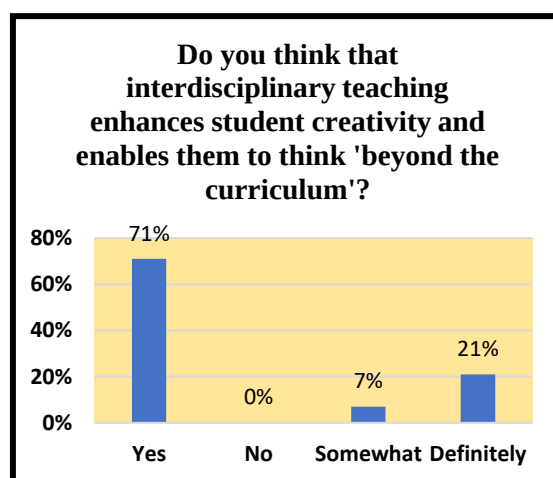


Figure 12

Interdisciplinary teaching's role in fostering creativity.

PEDAGOGY

The present topic stands quite relevant and must be included in school curriculum. It will enable teachers to adopt an educational approach that focuses on teaching both the historical and contemporary dynamics of the impact of development initiatives on forests. Students will then be able to analyse the shift involved from colonial to modern development initiatives. The integration of case studies of those displaced as a result of these development initiatives will enable students to connect with the content better and apply it to real world examples. The incorporation of visual elements such as power point presentations, images and documentaries in the teaching-learning process can make the lessons much more engaging and fruitful for the learners. Moreover, the pedagogical approach involved in the teaching of this topic will encourage critical thinking in students about balancing economic growth with ecological preservation.

Further, teachers can and must adopt an interdisciplinary approach while teaching this topic. Elements from history, geography, economics, environmental science must be integrated to help students think 'beyond the curriculum' and establish cross-curricular connection (shown in Figure-13). Teachers across varied disciplines can also collaborate with each other and organise workshops to enhance the quality of education being imparted. The pedagogy can also involve debates and presentations by students on the theme. It will encourage students to articulate their opinion and actively participate in the teaching-learning process. Further, theory must be supplemented by field trips and practical activities to actively engage students in projects that address contemporary challenges.

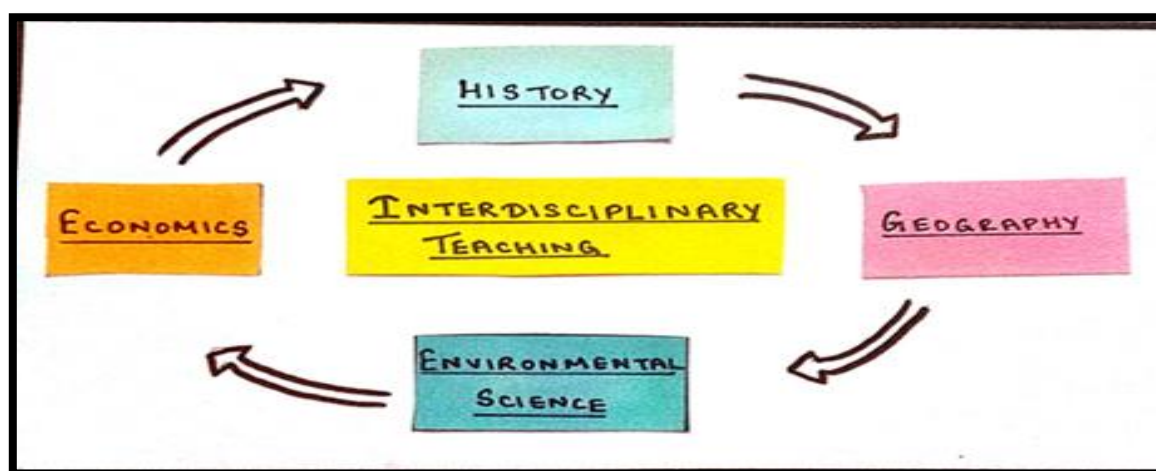


Figure 13

This illustration shows the correlation of subjects to each other in interdisciplinary teaching-learning.

RECOMMENDATIONS

a) Inclusion of the topic in school curriculum: The various boards such as CBSE and ISC can include the theme on the impact of current development initiatives on forests in the school



curriculum. It can be included in Class IX History Book of CBSE Board (Figure 14) wherein there is Chapter IV of Section-II entitled 'Forest Society and Colonialism' (Figure 15). On page 89, a new subtheme can be included under the heading 'Impact of Modern Development Initiatives on Forests' (Figure 16). This would be just after the discussion on colonial initiatives and its impact on forests. The inclusion of this theme will enable students to understand the evolution of forest policies from historical times down to the present. They will be able to apply the theme studied to real-world examples that they observe around them.

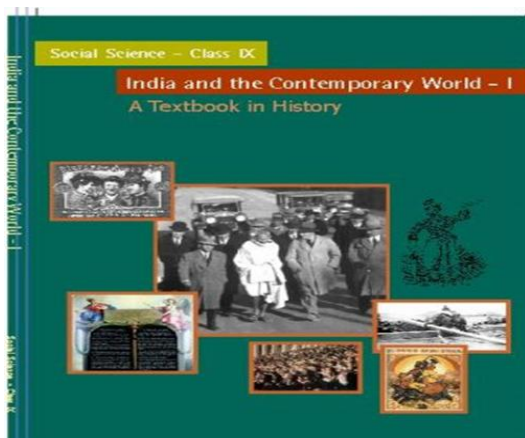


Figure 14

Class IX History Textbook-CBSE



Figure 15

Chapter IV of Section-II entitled 'Forest Society and Colonialism'



Figure 16

Page 89-Inclusion of a new subtheme entitled 'Impact of Modern Development Initiatives on Forests' is suggested.

b) Possibilities and scope for future research: The colonial intervention in the natural landscape of India and the resulting ecological degradation is well-known. However, what is relatively unknown is the fact that it was during this time that forestry education and forest research activities were started by the colonial officials. There were colonial scientists who linked forest protection with local people and took an interest in exploring the flora and fauna of India. Scholarly research on these aspects has been limited. Research along these dimensions supported by archival sources can provide interesting perspectives hitherto not documented.

CONCLUSION

Forests play a crucial role in the Indian social, cultural and natural landscape. They are sacred to some, a source of sustenance for many and sadly an avenue for developmental projects in recent times. The destruction of forests begun during the colonial rule has only increased in present times. The result is around us in the form of environmental degradation and stories of forced displacement of communities. The recurrent problem can be addressed by state initiatives to restrict forcible acquisition of land, ensure proper rehabilitation and check environmental degradation. More importantly, awareness can be instilled among children in school. Environment aspects can be integrated with their school subjects. They will learn to make cross-curricular connection and develop a sense of responsibility towards their environment which is crucial at this need of hour.

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FROM ERRORS TO EXCELLENCE: A JOURNEY OF SPELLING EMPOWERMENT THROUGH INTERACTIVE LEARNING AND ENGAGING WORKSHEETS

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Abstract

This action research paper investigates the efficacy of integrating spelling strategies taught through interactive sessions and engaging worksheets to enhance the spelling learning of a class 7 student. The study employed a mixed-methods approach, combining qualitative observations and quantitative assessments to evaluate the impact of the intervention. Over a period of nearly 3 months, the student participated in interactive sessions where various spelling strategies were introduced and reinforced through hands-on activities. Additionally, a series of meticulously designed worksheets were provided to complement the learning process. The results indicate a significant improvement in the student's spelling abilities, as evidenced by pre- and post-assessment scores and qualitative feedback. The findings suggest that the synthesis of interactive sessions and worksheets not only enhances spelling proficiency but also fosters a positive attitude towards learning. Implications for educators and recommendations for further research have also been discussed.

Keywords: Action Research, Engaging Worksheets, Spelling Proficiency, Qualitative Observations, Quantitative Assessments

INTRODUCTION

Spellings are the linguistic bedrock upon which communication is built, representing the meticulous arrangement of letters to convey meaning and clarity. According to Silva (2021), it is really important that children learn correct spelling practices and avoid spelling mistakes from a young age, as this will enable them to process, retain and relay information more easily. Best (2017) points out that spelling is the art of correctly assembling words from their letters. Shintani, Ellis and Suzuki (2014) believe that the main spelling errors are caused by the non-phonetic aspect of parts of the English language. Apart from the regular sounded elements, Liton (2013) argues that the foundation of spelling rules and instruction can help students learn the patterns of English language and reduce the likelihood of spelling errors. According to Kang and Han (2015) the systematic teaching of spelling should include strategies, guidance and most importantly, independent practice.

NEED OF THE STUDY

The imperative for conducting a study on an action research program designed to enhance the spelling skills of a class 7 student through interactive learning and engaging worksheets, is paramount. In today's educational landscape, literacy proficiency is fundamental for academic success and future endeavors. This study enriches the existing literature by exploring innovative strategies tailored to individual student needs,



fostering a deeper understanding of effective pedagogical approaches. Moreover, the anticipated outcomes hold significant implications for both educators and learners. For educators, insights garnered from this research can inform instructional practices, offering practical methodologies to tailor interventions for diverse learners. For students, the potential for improved spelling skills not only enhances academic achievement but also cultivates self-efficacy and confidence in their learning journey. Thus, this study not only contributes to the existing scholarly discourse but also promises tangible benefits for the individuals involved in the action research program.

REVIEW OF LITERATURE

A literature review discusses published information in a particular subject area, and sometimes information in a particular subject area within a certain time period.

Mann, Bushell, and Morris (2010) found that using phonetic pronunciation with the cover-copy-compare (CCC) technique improved spelling accuracy in elementary students.

A study by Medrano, Christina, Zych, Kathleen (1998) highlight phonics instruction as key to improving children's spelling by linking sounds to letters.

Porter and C, (2003) focus on the link between vocabulary and spelling proficiency, recommending activities like reading, word games, and word roots to improve spelling.

Moats (2005), explains that spelling and reading share similar underlying knowledge, and teaching spelling can improve reading skills by reinforcing letter-sound relationships.

Berninger and Fayol (2008) suggest that spelling involves encoding letter sequences using phonological, orthographic, and morphological codes to represent words in the mental dictionary. Children integrate these codes through instruction and practice to form accurate word spellings.

Nurhayati (2006) discusses identifying and addressing spelling difficulties through assessments and tailored interventions.

Qamariah and Wahyuni (2018), posits that using spelling games in EFL lessons increased seventh-grade students' interest in learning spelling.

Sayeski, (2011), identified four key elements for effective spelling instruction for students with learning disabilities, including study strategies, feedback, practice, and rule teaching. Teachers can enhance spelling by using assessment, systematic instruction, and morpheme-based teaching.

METHODOLOGY

Methodology is a system of methods used in a particular area of study or activity. It usually describes how the data was collected and how was it analyzed or even intervened to arrive at the desired outcome. The action research began with observation to find out the subject with spelling difficulties, interview of the teachers to cross verify the result of observation, and a detailed case study about the subject. After this a baseline study was conducted followed by ten interventions. The detailed methodology is as follows:

OBSERVATION - Observation is one method for collecting research data. It involves watching a participant and recording relevant behaviours for later analysis. Observation can be of different types such as : **i) Controlled observation** (usually a structured observation) are likely to be carried out in a psychology laboratory; **ii) Natural observation** (Unstructured observation) involves studying the spontaneous behaviour



of participants in natural surroundings; and **iii) Participant observation** is a variant of the natural observation but here the researcher joins in and becomes a part of the group they are studying to get a deeper insight into their lives.

Many naturalistic observation were done during the first month of internship in several occasions which are as follows:-

- 1) **Class observation** - Few classes taken by their teachers were to be observed as a part of the internship activity. During that time, sitting at the back of the classroom, a global view was possible.

Substitutions - Many substitutions with class 7 were given where many activities like vocabulary games, spelling Bee, word ladder, etc. were organised. At that time, a rough idea of the spelling difficulties of many students was drawn by the student-teacher.

- 2) **Classes** - This was the major chunk of time where there was an opportunity to observe them and find out the one with the most spelling deficit disorder. The student who was detected with the most spelling difficulties was often found making mistakes while writing anything that is being dictated. The same reflected in her worksheets and this problem also affected her academic performance as well.

INTERVIEW - The word 'interview' refers to one-on-one conversation with one person acting in the role of the interviewer and the other in the role of the interviewee. Interviews can be **structured interview** which is also known as a formal interview (like a job interview). Another type is the **unstructured interview** which are sometimes referred to as 'discovery interviews' and are more like a guided conversation than a strictly structured interview.

An unstructured interview of the class teacher of class 7 was taken who had the same opinions about the student subject having a problem regarding spellings. She is at times not even familiar with basic spellings. The class teacher had often noticed her struggling to keep up with the pace with other students while writing an answer which is being dictated to them or while giving a test, as she gets confused with several spellings when writing the answers, which affects her work.

CASE STUDY - Case study in psychology refers to the use of a descriptive research approach to obtain an in-depth analysis of a person, group, or phenomenon.

A detailed study about the student of class 7 affirms that, she has shown strong abilities in verbal communication and comprehension, but she consistently struggles with spelling. She frequently misspells common words and has difficulty remembering spelling rules. The student tends to rely heavily on phonetic spelling, often spelling words the way they sound. This leads to inaccuracies, especially with irregularly spelled words. She struggles to differentiate between homophones. Her written expression is limited by her spelling difficulties.

DATA COLLECTION -

Baseline Survey - In psychological research, a baseline is a measurement of the variable of interest at the beginning of treatment or a study that is used to compare to later measurement in order to judge the effectiveness of the interventions or treatment.



To find out where exactly the student is in her level of deficit or to find out the intensity of her deficiency in spelling, a baseline survey or study was assessed which consisted of three kinds of tasks. Data collection for the first baseline was done by giving the student to write twenty easy spellings, twenty moderate level spellings and finally to write twenty difficult spellings. This baseline was assessed after every ten interventions.

Interventions – In psychology, interventions are actions performed to bring about change in people.

After having assessed the first baseline survey, ten interventions were conducted. Each intervention was an activity to increase the proficiency of the student subject in spelling and to minimize her spelling errors. Each activity was conducted on a single day within a duration of 15 minutes. Sometimes even more than one activity were also conducted on a single day, keeping intact the time duration of 15 minutes for each activity. The supervision of the subject was done during the intervention.

Ten such interventions were done after which the baseline was repeated and the results differed positively. After the second baseline survey, another ten interventions were conducted and after the third baseline survey, another ten interventions were again conducted, till the fourth and the final baseline survey was made. Each activity during the intervention period differed in its level of difficulty (easy, medium, difficult) in each phase respectively.

DETAILED PLAN OF ACTION / DATA COLLECTION TABLE

CLASS - 7

TIME - 14.09.2023 – 22.11.2023

DATE	LESSON	ACTIVITY DONE	WORKSHEET
14.09.2023	BASELINE 1 (A) EASY	The first set of 20 spellings is administered on the student. They comprise of relatively simple spellings such as 'mice'. The student scored 17 out of 20 in the test.	1
14.09.2023	BASELINE 1 (B) MODERATE	The second set of 20 spellings is administered on the student. They comprise of relatively moderate spellings such as 'debt'. The student scored 11 out of 20 in the test.	2



14.09.2023	BASELINE 1 (C) DIFFICULT	The final set of 20 spellings is administered on the student. They comprise of relatively difficult spellings such as 'haughty'. The student scored 3 out of 20 in the test.	3
19.09.2023	CVC WORDS	The worksheet requires the CVC words to be identified and coloured.	4
20.09.2023	SYLLABLES	The number of syllables in each of the words given requires to be counted.	5
20.09.2023.	ALPHABETICAL ORDER	Each of the word list is to be written in alphabetical order.	6
26.09.2023.	'oi' AND 'oy' SOUND WORDS	The task is to circle the pictures and the letters in the given words that make the 'oi'/'oy' sounds.	7
26.09.2023.	SILENT LETTERS	The silent letters in the given sentences is to be circled and words having silent letters in them have to be grouped under the correct boxes.	8



26.09.2023.	LONG 'A' SOUND WORDS	Words with long 'A' sound often have the vowel sound similar to the letter 'a' for example 'gate', 'rate'. The task is to sort and write the long 'A' words under the correct sounds given.	9
27.09.2023.	FINDING HIDDEN WORDS	The task is to find the three letter words that are hiding in each of the given words.	10
27.09.2023.	'ch' WORDS	The activity is to circle all the words beginning with 'ch' and to write them down.	11
04.10.2023.	'-tial' AND '-cial' WORD PARTS	The task is to complete each of the given word parts with '-tial' or '-cial' and write down the words.	12
04.10.2023.	CORRECTLY SPELLED WORDS	The correctly spelled word in each of the given sets is required to be coloured.	13
05.10.2023.	BASELINE 2 (A) EASY	The first set of 20 spellings is administered on the student. They comprise of relatively simple spellings such as 'rope'.	14



		The student scored 19 out of 20 in the test.	
05.10.2023.	BASELINE 2 (B) MODERATE	The second set of 20 spellings is administered on the student. They comprise relatively moderate spellings such as 'occasion'. The student scored 10 out of 20 in the test.	15
05.10.2023.	BASELINE 2 (C) DIFFICULT	The final set of 20 spellings is administered on the student. They comprise of relatively difficult spellings such as 'reprehensible'. The student scored 6 out of 20 in the test.	16
09.10.2023.	ROOT WORDS	The activity is to write down the root word or base word for each of the given words.	17
09.10.2023.	PREFIXES	The task is to add the suitable prefixes to each of the given words in order to make a new word.	18
09.10.2023.	SUFFIXES	The activity is to choose the proper words with the suffixes '-able' and '-ible' to complete each of the given sentences.	19



12.10.2023.	WORDS ENDING WITH 'ing'	The task is to add 'ing' to the given words ending with 'e'.	20
12.10.2023.	THE SUFFIX 'ed' : DOUBLE CONSONANT THE	The task is to add the suffix 'ed' to each of the given words and write down the new words in the blanks to complete the sentences.	21
12.10.2023.	SOUND WORDS	The given animal sounds need to be chosen for the suitable animals listed.	22
12.10.2023.	COMPOUND WORDS	The activity is to circle the word in each line that is not a compound word.	23
18.10.2023.	WORD PUZZLE	The activity is to search for the listed words in the puzzle and circle them out.	24
18.10.2023.	HOMOPHONES	In this worksheet, a list of sentences have been given. The student has to put the correct homophones from the clue box given.	25
		In this worksheet, a word bank is given. A list of incomplete	



18.10.2023.	THE VOCABULARY BOX	sentences have been given and the student is required to fill in the blanks by choosing the most appropriate words from the word bank. The first set of 20 spellings is administered on the student. They comprise of relatively simple spellings such as 'shy'. The student scored 20 out of 20 in the test.	26
01.11.2023.	BASELINE 3 (A) EASY	The second set of 20 spellings is administered on the student. They comprise relatively moderate spellings such as 'receipt'. The student scored 13 out of 20 in the test.	27
01.11.2023.	BASELINE 3 (B) MODERATE	The final set of 20 spellings is administered on the student. They comprise of relatively difficult spellings such as 'didgeridoo'. The student scored 10 out of 20 in the test. The activity is to circle words that should be capitalized and to capitalize each of the given sentences	28



01.11.2023.	BASELINE 3 (C) DIFFICULT	correctly by rewriting them. The task is to categorize the given set of words under the correct boxes of Person, Animal, Thing and Place.	29
02.11.2023.	CAPITALIZATION		30
02.11.2023.	CATEGORIZE WORDS		31



06.11.2023.	SPELLING WORD MAZE	In this worksheet, a spelling word maze is provided where the correctly spelt words are to be marked.	32
06.11.2023.	RHYMING WORDS	A rhyming word for each of the given words is required to be written.	33
06.11.2023.	PLURAL NOUNS	The task is to complete each of the given sentences by filling the blanks with the plural form of the words in the bracket.	34
08.11.2023.	SYNONYMS	In this worksheet, the student is required to rewrite a given paragraph by changing the underlined words to their synonyms.	35



08.11.2023.	ANTONYMS	In this worksheet, the student is required to change the underlined words in the given sentences to its antonyms.	36
08.11.2023.	UNSCRAMBLING JUMBLED WORDS	The task is to unscramble the words by viewing a given list of compound words for help.	37
21.11.2023.	WORD ASSOCIATION	In this worksheet, the student is required to write two words each that comes to her mind when she hears each of the words listed.	38
21.11.2023.	FRAMING SENTENCES	The activity is to create sentences for each word in the word bank given.	39
	BASELINE 4 (A)	The first set of 20 spellings is administered on the student. They comprise of relatively simple spellings such as 'hem'. The student scored 20 out of 20 in the test. The second set of 20 spellings is	



22.11.2023.	EASY	administered on the student. They comprise relatively moderate spellings such as 'manipulate'. The student scored 18 out of 20 in the test.	40
	BASELINE 4 (B)	The final set of 20 spellings is administered on the student. They comprise of relatively difficult spellings such as 'Mississippi'. The student scored 18 out of 20 in the test.	41
22.11.2023.	MODERATE		
	BASELINE 4 (C)		
22.11.2023.	DIFFICULT		42



DATA ANALYSIS

Parameters Used :

Spelling accuracy and consistency are simple parameters for assessing student's spelling proficiency. Evaluating correct spelling of commonly used words and adherence to spelling rules were the straightforward parameters used to measure the spelling proficiency of the child.

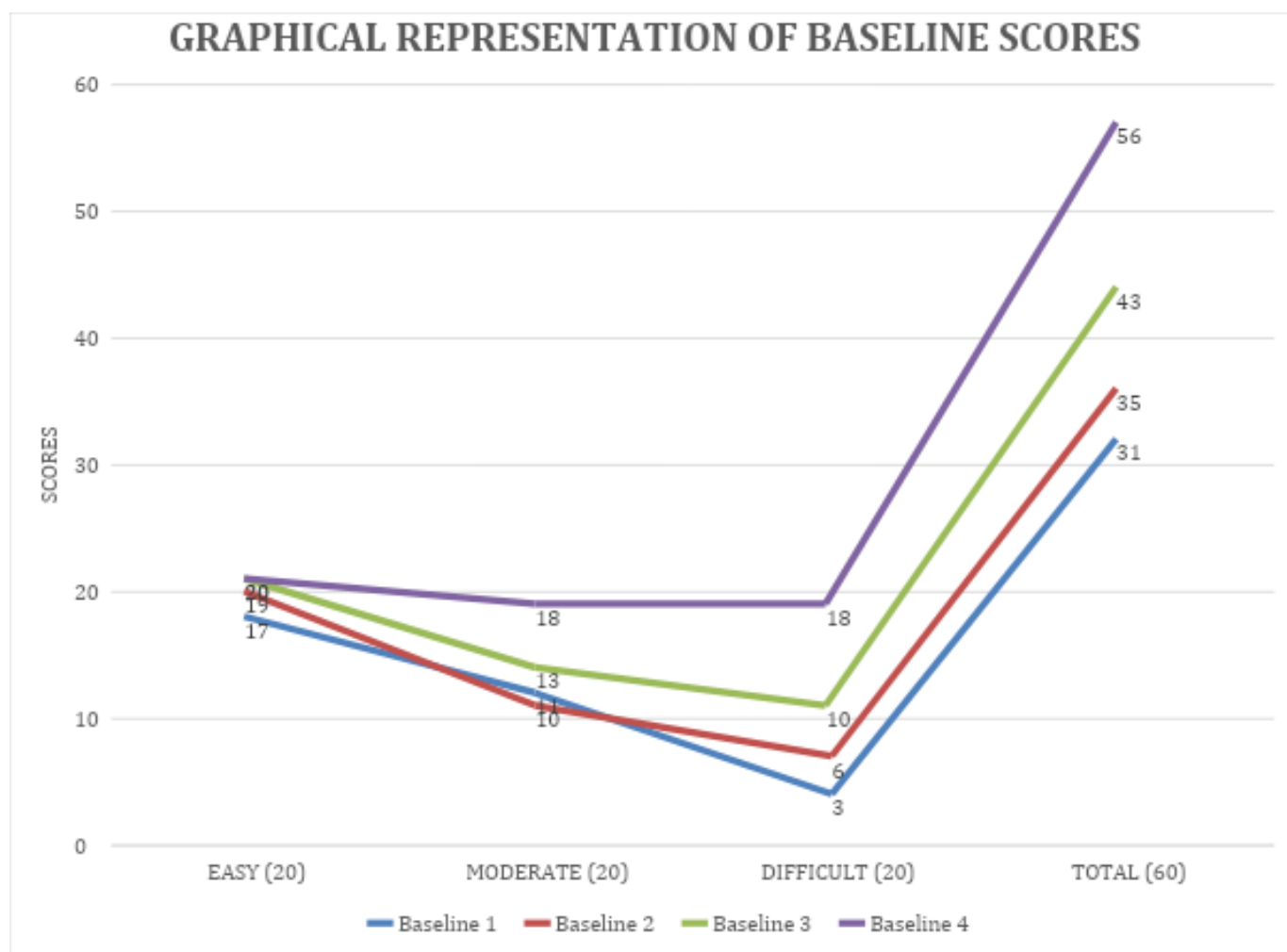
Tabular Representation Of Scores :

The following table represents the marks scored by the student in each of the baseline tests that were assessed after every ten set of interventions. Each of the baseline tests have 3 difficulty levels – Easy, Moderate and Difficult. At each difficulty level, the student was given a set of 20 spellings, thus adding up to a total of 60 spellings for each of the four baseline tests assessed.

BASELINE TESTS	EASY (20)	MODERATE (20)	DIFFICULT (20)	TOTAL (60)
Baseline 1	17	11	3	31
Baseline 2	19	10	6	35
Baseline 3	20	13	10	43
Baseline 4	20	18	18	56

In the comparative table above, we can see that in the first baseline test, the total score of the student was 31 out of 60 but in the second baseline test there is a slight improvement in her scores. In the easy and difficult levels, she scored 19 and 6 against 17 and 3 respectively, in the first baseline. The total score of the student in the second baseline test was 35 out of 60 which shows some level of improvement especially in the easy and in the difficult level. In the third baseline, a marked improvement can be seen in her scores, especially in the greatest difficulty level, where she scored 10 against 6 in the second baseline. Her scores also show a slight improvement in the easy and moderate levels of the third baseline. Her total score in the third baseline was 43 out of 60 which can be considered as a huge improvement when compared to the grand total of 31 and 35 out of 60 in her first and second baseline tests, respectively. In the fourth and final baseline, the student has a total score of 56 out of 60 which shows a remarkable overall improvement when compared to the grand total of 31, 35 and 43 in her first, second and third baseline tests, respectively. There is a profound and commendable improvement in her moderate and difficult level scores in the fourth baseline test when compared to all the three baseline tests. This considerable difference in scores depicts that learning has taken place.

Graphical Representation of Scores :



In the line graph shown, we can see a successful learning taking place in the student with regards to spelling over a period of nearly three months. The line graph has two axis – the X-axis represents the difficulty levels of the baseline tests which are been compared over time and the Y-axis depicts the scale which is a set of numbers that represent the data of the baseline scores organized into equal intervals.

The four different coloured lines represent the four baseline tests of the student which were assessed after the completion of 10 interventions each. The blue line shows Baseline 1 where the scores of the student are relatively low. The red line located above the blue line shows Baseline 2, where we can see that the red line is a little above the blue line at the easy and difficult level and dropping a little below the blue line at the moderate level which depicts that there has been a very slight improvement in the student's scores. The green line in the graph shows Baseline 3 which is comparatively at a higher level above the blue and the red line, depicting that there has been a huge and marked improvement in the student's scores. The purple line in the graph shows the final baseline, i. e. Baseline 4 and it is situated high above all the other lines which depicts that the overall scores of the student in the fourth baseline spelling test was remarkably higher, better and commendable than the rest of the three baseline tests.

RESULT AND DISCUSSION



After the selection of the student subject, A. W. of class 7, the action research programme began with the first baseline survey which reflected the spelling errors of the student. The first baseline test showed that the student was not attentive to the pronunciation of the words being spelled out to her before writing them down. On being asked the reason, A. W. conveyed to the student-teacher that she would get all her spellings wrong even if she writes them down by being attentive. This depicted her lack of self-confidence and her loss of interest to improve her spelling skills. A. W. faced a great difficulty in writing down the moderate and difficult level words in comparison to the easy words. A. W. made a lot of spelling errors such as misjudging the pronunciations, missing out the silent letters, missing out some core well-spelt letters, misspelling 'e' as 'i' for instance 'ditachment' in place of 'detachment', misspelling 'c' as 's' for instance 'essentric' in place of 'eccentric' and random capitalization of any word she feels. She also faced difficulty while pronouncing some of the moderate and difficult level words herself. After the first baseline test was assessed, the first 10 set of interventions were carried out to teach A. W. some of the ground rules of spelling. Over the first ten interventions, A. W. regained her lost interest and displayed an honest attempt to learn the rules of spelling and to rectify her spelling errors.

After the execution of the first 10 set of interventions, the second baseline test of A. W. was administered, which showed that she had a little less difficulty in writing down the moderate and difficult level words and consciously tried very hard to get all the spellings correct. A. W. even made an attempt on her own to loudly spell out some of the difficult words and break them into syllables in an attempt to write them down correctly. A. W. also made an attempt to carefully recognize the silent letters in the words pronounced. However, most of her spelling difficulties still persisted such as missing out core spelt letters, dropping the double letters in a word for instance 'sucess' in place of 'success', dropping the 'e' at the end of words like 'catastrophe' and misspelling 'c' as 'k' for instance 'stakato' in place of 'staccato'. After the second baseline test was assessed, the second set of 10 interventions were carried out to make A. W. familiar with some other general principles of spelling. Over the second set of ten interventions, A. W. developed a marked interest and excitement to learn the rules of spelling and solve all the spelling activities.

After the execution of the second set of 10 interventions, the third baseline test of A. W. was taken, which showed a huge improvement in her spelling skills which led her to write the easy and moderate level spellings with ease. Though A. W. still felt a little less confident to write the difficult level spellings but she took an intense effort to apply all of the spelling rules being taught to her which got her half of the spellings in the category of difficult level correct. A. W. was successful in recognizing few of the silent letters as well as the correct use of letters like 'e', 'i', 'c', 's' and 'k'. Her understanding of root words, prefixes and suffixes was also revealed during the third baseline survey. However, she continued to make some of the spelling errors such as missing out a few core spelt letters, dropping the double letters and the letter 'e' in some words, misspelling 'a' as 'u' for instance 'catustrophe' in place of 'catastrophe' and random capitalization of words. After the third baseline test was assessed, the third and the final set of 10 interventions were carried out to teach A. W. some other relevant rules of spelling. Over the final set of ten interventions, A. W. displayed a willful and enthusiastic spirit to learn the new set of spelling principles.

After the execution of the final set of ten interventions, the fourth and the final baseline test of A. W. was administered, which showed a remarkable overall improvement in her spelling proficiency which led her to minimize her spelling errors. A. W. was successful in effectively imbibing and applying the taught spelling principles and strategies while she took the fourth baseline test. A. W. felt more confident and revealed a nuanced understanding of her spelling skills, especially while she wrote all the moderate and difficult level spellings and got almost all the spellings correct in both the categories. A. W. was successful in recognizing almost all the silent letters and as well as the correct use of especially letters like 'a', 'u', 'e' and 'i'. Her tendency to miss out on core spelt letters and to drop the double letters and letters like 'e' in some of the words



minimized to a great extent. A. W. also showed her correct understanding of capitalization of words. She paid greater attention to the pronunciation of the words this time and herself pronounced most of the moderate and difficult level words correctly.

Thus, it can be confidently stated that the action research programme targeted to improve the spelling proficiency of A. W. was successful, for it brought about positive changes in her spelling proficiency both quantitatively and qualitatively. The student subject showed a commendable overall improvement in her spelling skills. Her quick adaptation to the diverse principles and strategies of spelling helped her minimize the spelling errors, which in turn had a positive impact on her level of academic performance.

CONCLUSION

The action research programme had the intention of improving the spelling proficiency of the chosen subject. After having conducted the programme, the interventions have been able to bring about both quantitative and qualitative changes in the subject. Through the interventions carried out, A. W. was able to find her self-esteem, realize her true potential and gain immense self-confidence. This was clearly reflected in the steady improvement of scores in all the successive baseline tests that she took. Witnessing A. W. gradually learn the rules of spelling and improve her overall proficiency in spellings felt immensely rewarding to the student-teacher. It greatly encouraged and inspired the student-teacher to carry out such intervention work with students in actual need for it, in the near future.

LIMITATIONS

During the course of the action research there were several difficulties faced. Taking out time for the interventions to be conducted during the busy school hours was the foremost problematic challenge. Demanding time from the child for extra spelling activities when she was already tied down by the pressure of academics and several co-curricular activities was also a notable challenge. Thus, keeping all the challenges and limitations in mind, it must be stated that the school authority and the student subject herself displayed tremendous cooperation, which helped the student-teacher to complete the action research programme.

RECOMMENDATION

Spelling improvement programmes in schools play a crucial role in enhancing language skills and communication abilities among students. Future directions may involve incorporating technology, such as interactive apps, to make spelling practice more engaging and personalized. Collaboration with linguists and language experts can contribute to designing comprehensive spelling curricula that align with linguistic principles. Introducing game elements can foster a positive learning environment, encouraging students to actively participate in spelling exercises. Adaptive learning systems can tailor spelling challenges to individual student needs, addressing weaknesses and reinforcing strengths. Integrating spelling improvement within a broader context of writing skills can enhance practical application and overall language competency. Collaboration between educators and parents is essential to create a consistent approach to spelling improvement, bridging the gap between school and home learning environments. Regular assessment and feedback mechanisms are crucial to track students' progress and adjust teaching strategies accordingly. Emphasizing the real-world relevance of strong spelling skills, such as in professional communication, ensures that students recognize the practical importance of these programs in their future endeavours.



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BREAKING BARRIERS OF THE LEARNING CURVE: TACKLING CONCEPTUAL CHALLENGES IN ADOLESCENT EDUCATION

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Abstract

Concept is one of the problems that the adolescent population faces. It has serious implications for their educational lives and development. This is an effort to discuss conceptual hurdles adolescents face during their academic learning regarding their nature, causes, and solutions. Adolescents continually experience conceptual and procedural difficulties, and this is particularly common among significant academic subject matters. These consist of cognitive developmental stages, socio-cultural aspects, prior knowledge gaps, and instructional methodologies. The target is to determine the vital areas of academic subjects where adolescents frequently face procedural and conceptual problems to probe the leading causes of difficulties among adolescents through identifying and analyzing the specific problem areas of academic subjects and assessing the underlying causes and contributing factors of conceptual difficulties among adolescents. The subject was identified and chosen among a group of 57 students with the help of a screening test. The subject is in class VII. The data was collected with the help of various worksheets, puzzles, mental maps and others. The findings show that conceptual challenges in academia have an impact on adolescent's academic performance, motivation and future educational and career paths, which can shake their confidence and belief in themselves in environments potentially leading to disinterest and dropping out. The adolescent should be actively engaged, Interactive teaching methods and visual aids should be used. The presence of challenges among adolescents not only brings about significant obstacles but also opens doors for creativity and enhancement in educational approaches. By identifying the root causes and applying solutions, individuals involved can support adolescents in overcoming these hurdles and achieving success, thereby nurturing their overall growth, future opportunities and educational outcomes. This collaborative effort should involve teachers, parents and counselors working together towards this goal.

Keywords: *Adolescents, Academic Learning, Conceptual Problems, Educational Outcomes, Instructional Strategies, Cognitive Development*

INTRODUCTION

"Education breeds certainty, certainty breeds trust and trust breeds peace" - CONFUCIOUS

"Education is the most powerful weapon which you can use to change the world" - NELSON MANDELA.

The concept of education is foundational to human society and civilization. It plays a pivotal part in forming people, communities, and countries. Instruction is not fair almost obtaining information but too almost



creating aptitudes, cultivating basic considering, and advancing individual development. Instruction can be broadly characterized as the handle of encouraging learning, obtaining information, aptitudes, values, and demeanors in a organized and precise way. It includes different formal and casual strategies, counting instructing, preparing, investigate, and encounter. One of the reasons of instruction is ability, information and concepts securing. If the establishment is not concrete, there will be an obstacle in encourage advancement of the adolescents.

Delor's Commission (1996) in its report called 'learning, the treasure within' notes the taking after : Instruction must be organized around four crucial sorts of learning, in a way be the four columns, of information; that is procuring the rebellious of understanding, learning to do: so as to be able to act imaginatively on one's environment, Learning to live together: so as to take an interest with other individuals in all human exercises, and learning to be: create one's identity and be able to act with more noteworthy independence, judgment and individual duty (Murthy, 2012). Education for maintainable advancement and for a superior quality of life has ended up an enormous obligation. The development of a worldwide viewpoint, a cherish nature and a concern for individual human creatures and situations ought to be portion of the conspire of the instruction. This kind of all-encompassing instruction encourages understudies to get character, meaning and reason of life through associations to community, in the characteristic world and otherworldly values such as sympathy and peace. This can be fulfilled not only through an scholastic educational modules but through coordinate engagement with the environment (Mill operator J.P 1999).

Holistic instruction as "what recognizes all-encompassing instruction from other shapes of instruction is its objectives, its consideration to exploratory learning and the importance it places on the connections and essential human values inside the learning environment". It emphasizes connectedness of all living creatures (Martin,2002). Adolescence is a basic organize between childhood and adulthood. Distinctive psycho-sociological hypotheses have given distinctive viewpoints on understanding the highlights and forms of juvenile advancement. Puberty is a powerless time for most children since they can create propensities they hold onto in their grown-up lives. The stages of puberty can be categorized into early puberty (ages 10 to 13 a long time), center youth (ages 14 to 17 a long time), and late youth (ages 18 - 22 a long time) (Allen & Waterman, 2019).

Here, I am managing with center youth group. The reasons, behind challenges confronted by youths are changed. Speculations on advancement like Piagets hypothesis highlight the importance of development in getting a handle on unique thoughts. Additionally social and social impacts such as status, parental back and school assets play a part in forming them towards scholastic advance and understanding of concepts. The effect of challenges on juvenile is noteworthy influencing their grades, inspiration and future prospects in instruction and career choices. Moreover uncertain issues with understanding concepts can shake their certainty and conviction in their capacities in school possibly driving to lack of engagement and dropping out. Managing with challenges among youngsters requires an approach including instructors, guardians, choice producers and individuals of the community. By utilizing demonstrated educating strategies, like framework, separated instruction, framework, and hands-on learning encounters with the offer assistance of inquiry-based learning can upgrade comprehension and dominance of concepts.

Research at the auxiliary and indeed post-secondary level on understanding of essential concepts that are included in tackling instructive issues shows that understudies do not get it the concepts. This is affirmed by numerous inquiries on issues tackling in which understudies fathom issues out loud. Inquire about appears that indeed in spite of the fact that understudies regularly fathom issues accurately, they are incapable to reply conceptual questions on which the issues are based. Issue- tackling inquiries has driven to the distinguishing proof of commonly held logical misinterpretations, and to the conclusion that tending to these misguided judgments in instruction may offer assistance to progress students' problem-solving capacity.



Conceptual issues in scholastics among young people can stem from different sources and can show in distinctive ways. These issues regularly rotate around troubles in understanding and applying theoretical or complex concepts. Lack of conceptual understanding can lead to different other issues like

1. Consideration insufficiency in lesson or Attention deficiency- Youths with attention-deficit/hyperactivity clutter (ADHD) involvement more deterrents in their way to victory than the normal understudy. The indications of ADHD, such as failure to pay consideration, trouble sitting still, and trouble controlling driving forces, can make it difficult for children with this determination to do well in school.

2. Scholarly lingering or Academic Procrastination- Scholarly lingering is a wonder where understudies superfluously put off scholarly assignments, like considering for a test or working on a school extend. This is a common issue, which can lead to issues like more awful scholarly results and expanded stress.

3. Scholastic stretch and self-efficacy- The upsetting response to school and homework might diminish self-efficacy in the same setting (i.e. scholastic self-efficacy), coming about in expanded mental trouble (Bandura, 1997)

4. Overlooking, destitute memory and need of intrigued- Sadness has been connected to memory issues, such as distraction or perplexity. It can too make it troublesome to center on work or other errands, make choices, or think clearly. Stretch and uneasiness can too lead to destitute memory. Sadness is related with short-term memory loss.

NEED OF THE STUDY

The purpose of this research is to bring about a significant change in the conceptual understanding of the school student by developing a competence in conceptual understanding and gradually working to increase attention, remove procrastination and to find interest in the academics.

- To detect the one with the most conceptualized problem through several methods.
- To provide interventions where several tasks will be given that would demand intense attention from the child.
- To complete a tasks within a stipulated period of time.
- To increase the attention span and duration of the tasks thereby removing academic procrastination.
- To improve insightful writing, faster reading ability and vocabulary developing an eye for precision.
- To increase memory especially short term that is required to complete the tasks.
- To increase the retention of information which shall help in academic performance.
- To be attentive in class.
- To be able to contribute in the classroom discourse.
- T promotes inclusivity and equity.
- To address academic gaps, creating a positive learning environment, and fulfilling legal and ethical responsibilities.
- To check the creativity level, self-expression, critical thinking, and logical reasoning of the subject.
- To increase self-esteem which shall arise from a sense of achievement in academic success.

METHODOLOGY



Methodology is a system of methods used in a particular area of study. It usually describes how the data was collected and how was it analyzed or intervened to arise at a desired outcome.

The action research began with observation to find out the subject with conceptual problems, interview of the teachers to cross verify the result of observation and a detailed case study about the subject. After this a screening test was conducted followed by eight interventions. The detailed methodology is as follows:-

OBSERVATION- Observation method is described as a method to observe and describe the behavior of a subject and it involves the basic technique of simply watching the phenomena until some hunch or insight is gained (Kumar,2022). It involves watching a participant and recording relevant data for later analysis. It has the advantage of providing direct evidence of the phenomenon that is being studied. Many naturalist observations were done during the first month of internship in several occasions which are as follows:-

1. Class observation- Few classes taken by the permanent teacher was observed as a part of the internship activity. During that time, sitting at the back of the class a global view was available. 2. Substitution- Some substitution classes were given where many activities like quiz, debate, memory game, vocabulary games were organized. At that time a rough idea of the attention level of many students were drawn by me.

3. Classes- This was the major time where there was an opportunity to observe them and find out the one with most difficulty. The student who was detected with the most conceptual problems was often found to lose link of the class discussion. When questions were asked to evaluate the subject in the middle of the lesson, the subject could hardly answer. The same reflected in her worksheets where she failed to follow instructions.

INTERVIEW- The interview is an important data gathering technique involving verbal communication between the researcher and the subject. Interviews are used in various survey designs, in exploratory and descriptive studies. Interview can be of 2 types like structured and unstructured. In structured interview the subject is allowed to talk freely and in the later the subjects responses are limited to direct answering. (Mathers,2000). An unstructured interview of the class teacher of class 7A was taken who had the same opinion about the subject of having the same problem of attention, academic procrastination, lack of retention power. Her performance is inconsistent. She seems to perform better in short units than in long terminals. An interview of the subject teacher that is geography was also taken regarding the particular subject. She had often noticed her of being absent minded, not being able to answer correctly while catching up when given a cue.

CASE STUDY- Case study research, most often associated with qualitative inquiry has gained significance as an effective approach to investigate complex issues in real-world settings. Conducting case research is considered to be appropriate when a contemporary phenomenon is to be studied (Pandey, 2019). A detailed study about the subject's academic performance in the present as well as the previous class was done. Her performance in co-curricular activities were taken into consideration. It was found that she had been consistently suffering from various academic issues.

ACTIVITY- The subject was identified on the basis of a screening test. Screening test was done to find out where exactly the student is in her level of deficit. The subject is of class VII. Two screening test was done. One consisting of a map of India where the subject failed to identify the states and capitals and thus the industries were marked in the wrong states.

Another screening test consisted of a worksheet to write down a difference between renewable and non-renewable energy but the subject swapped the two pointing out that there is a problem in the conceptual understanding of the students which become the main area of the research. Thus the subject was chosen highlighting the problem in the conceptual understanding of the subject.



INTERVENTIONS- Intervention research is all about learning what treatments or strategies work best to improve outcomes and making a difference in what matters most to you (Hulley, 2006). Interventions are actions performed to bring out change in people.

After having conducted the screening test, eight interventions were conducted. Each intervention was an activity to develop the child, improve attention level, release academic stress and to check the consistent performance of the subject. Each activity was conducted on a single day. The supervision of the subject was done during the intervention. Each activity in the intervention differed in the level of difficulty (easy, medium, difficult).

REVIEW OF LITERATURE

- Randeep pannu (2010), "A ponder of scholastic accomplishment in connection to cognitive styles identity characteristics and alteration of adolescents". This paper bargains with the cognitive understanding in connection to the scholastic accomplishment and gathered that Cognitive styles (precise and instinctive), identity calculate, domestic alteration, wellbeing alteration, enthusiastic alteration, sex and area impacted the scholastic accomplishment of young people though social alteration and sort of school did not impact the scholarly accomplishment of adolescents.

- Srinivasa Murthy, A (2012), "Deprived understanding of youths in connection to their alteration and choice making in academics". This paper addresses the issue of conceptual understanding driving to moo scholastic accomplishment and induced that youths have developed up altogether to meet the challenges of alteration issues. There exists a noteworthy affiliation between the alteration and scholastic accomplishment of young people and bad habit versa. This might be since of the display instructive framework which gives small scope for improvement of alteration skills.

- Arti Pasricha (2015), "Study of scholastic stretch and self-adequacy in connection to ponder propensities identity and scholarly accomplishment of adolescents". This paper tended to the connection between scholarly push and self-viability of a pre-adult and concluded that there is a critical positive relationship between Scholarly Self-efficacy, Scholastic stretch and Identity of Youthful and in this manner there will be noteworthy effect on the scholarly achievement.

- Satish Kumar Gill (2016), "Study of scholastic accomplishment of senior auxiliary school understudies in connection to their learning styles and school environment". The paper uncovered that learning fashion plays an vital part in the scholarly and indeed non scholarly accomplishment of the understudies. An Person contrasts too play a crucial part in learning styles of children. The learning fashion of an person is related to components such as earlier learning encounters, openness to interpersonal and intrapersonal data, physical offices, learning environment and intrigued to learn modern things.

- Surekha Khokhar (2016), "Academic stretch and scholastic accomplishment of senior auxiliary school understudies in connection to time administration locus of control level of goal and learning styles". This paper pointed out that there is a positive connection between scholarly stretch and accomplishment of understudies and in this way the examiner centered that school specialists and instructors are proposed that the understudies are not over-burden with work as it may adversely influence their effectiveness. It is moreover proposed that endeavors ought to be made by the school specialists to energize instructors to keep up friendly relations with students.

- Suman (2017). "Study of scholastic accomplishment and ponder propensities among school understudies in connection to their meta cognitive aptitudes learning and considering style". The examination pointed to ponder scholarly accomplishment and think about propensities among school understudies in connection to



their meta-cognitive abilities and learning & considering fashion. All the three factors were detailed to have critical primary impact on scholarly accomplishment of school understudies.

•Sampa Barman (2018), “A Think about of Cognitive Fashion Passionate Insights and Locus of Control as Indicators of Scholarly Accomplishment of Auxiliary School Students”. The paper gathered that cognitive fashion is a pivotal factor that can affect scholarly accomplishment by impacting how understudies approach learning, problem-solving, memory, consideration, and inspiration. Instructors and teachers can upgrade scholarly victory by recognizing and pleasing assorted cognitive styles in their educating strategies, permitting for a more comprehensive and successful instructive experience.

•Bhimappa Rangannavar (2019), “A Ponder of Cognitive Styles Identity Needs and Metacognitive Mindfulness in Connection to Scholarly Accomplishment of Central School Understudies of Tall Achievers Moo Achievers and Beneath Achievers”. The paper tended to that the scholarly accomplishment is affected by Cognitive fashion Identity and Metacognitive mindfulness. The agent concluded by this ponder that Cognitive Styles, Identity Needs and Metacognitive Mindfulness exceedingly impact the scholarly accomplishments of understudies. Subsequently these factors are to be reflected as imperative components in central school direction and counseling.

•Jyotika Kharbanda (2022), “Cognitive Cacophony as A Determinant of Basic Considering Scholastic Accomplishment and Scholastic Separation of Higher Auxiliary Students”. The paper uncovered that Cognitive Disharmony was contrarily related to Basic Considering and Scholastic Accomplishment and tends to diminish them and is emphatically related to Scholastic Withdrawal and tends to increment it.

•Priyanka Rani (2022), “Effect of meta cognitive aptitudes Instructive flexibility and parental Support on scholastic accomplishment of auxiliary school students”. The paper concluded that the government and private school understudies with tall meta-cognitive aptitude were famous to have rise to scholarly accomplishment and the government and private school understudies with tall instructive versatility were famous to have break even with scholastic accomplishment The government and private school understudies with tall parental support were famous to have rise to scholarly achievement.

RESULTS AND DISCUSSIONS

The Action Research program began on September 6th, 2023 during the teacher trainee's school internship. After the selection of the student of class VII, with the help of concerned class teacher and other subject teachers, the action research began with the various interventions to improve the student's conceptual problem in academics.

INTERVENTION 1

The first intervention consist of giving a geography worksheet on concept mapping where she had to conceptualize in different format the major group of countries of Europe and their respective countries. Since the worksheet require creative and objective answers, it would check whether the subject is better understanding visually and being able to draw meaningful connections or not.

POST-INTERVENTION OBSERVATION

It was observed that the subject could not complete the task within the stipulated time which was 20 minutes. She took into consideration only 4 group of countries and failed to provide any justification for that choice. Some countries within the group of countries are written in capital and some in small pointing out confusion in the creative aspect. The subject is better understanding visually but requires more time to complete the task.



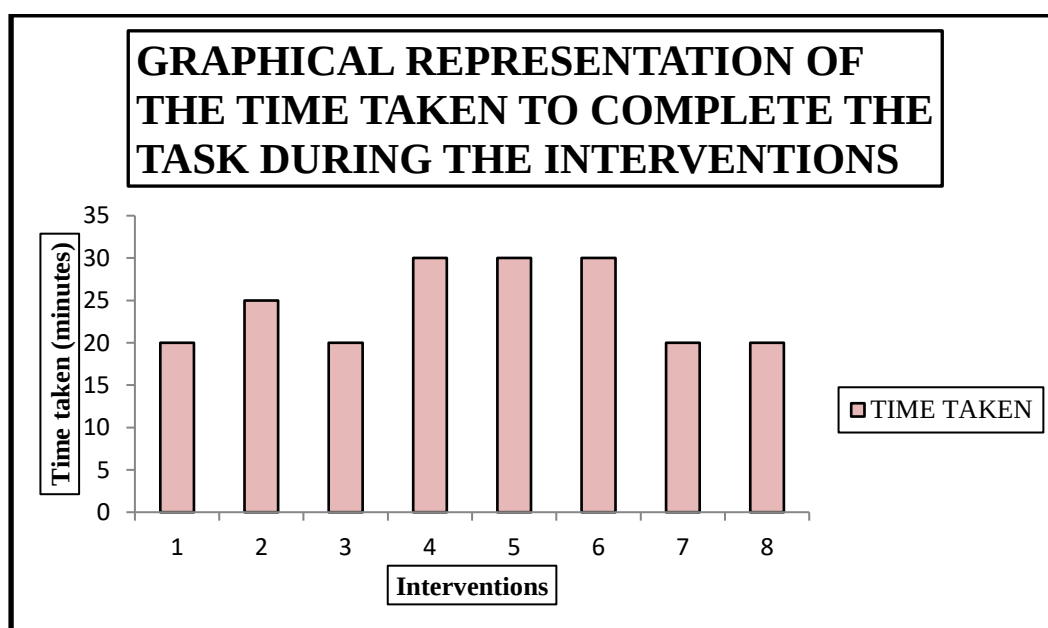
INTERVENTION 2

The second intervention was planned in such a manner so that the subject is able to memorize all the states and union territory with the help of a Mnemonic. The subject was asked to make a mnemonic consisting of all the first letters of the states and union territory with an interesting story. Since this activity requires the subject to memorize the name of the states and union territory, it would check the subject's capacity to retain information through a fun activity.

POST-INTERVENTION OBSERVATION

It was observed that the subject was unable to understand the meaning of mnemonic. She made up random letters to combine the words. She did not consider the two islands as a part of mainland. When asked, she said she did not know they are a part of India. This shows lack of knowledge and understanding but she was able to name all the states from east to west when asked in person and was able to complete the task within the stipulated time. The subject retained the information in her own way through the corrupted mnemonic made by her but she still requires assistance to understand the concepts.

Figure No.1



Source: Primary Data

INTERVENTION-3

The third intervention was planned in such a manner so that the subject is able to reinforce connections between the concepts and the application. It mainly focuses on understanding of the concepts and the lateral application. The subject is given a geography worksheet on solving 10 puzzles within 20 minutes. This would check the ability of the subject to develop connections between theoretical and practical applications of the concepts.



POST-INTERVENTION OBSERVATION

It was observed that the subject failed miserably in solving the puzzles. Out of 10 puzzles, she could only solve 2 and rest was either wrong or did not attempt to answer. The subject was in a hurry to complete the task and did not concentrate enough to solve the puzzles. She has the capability but lack of concentration was the issue here which is also a symptom of conceptual problem. The subject failed to develop connections between theoretical and practical applications of the concepts.

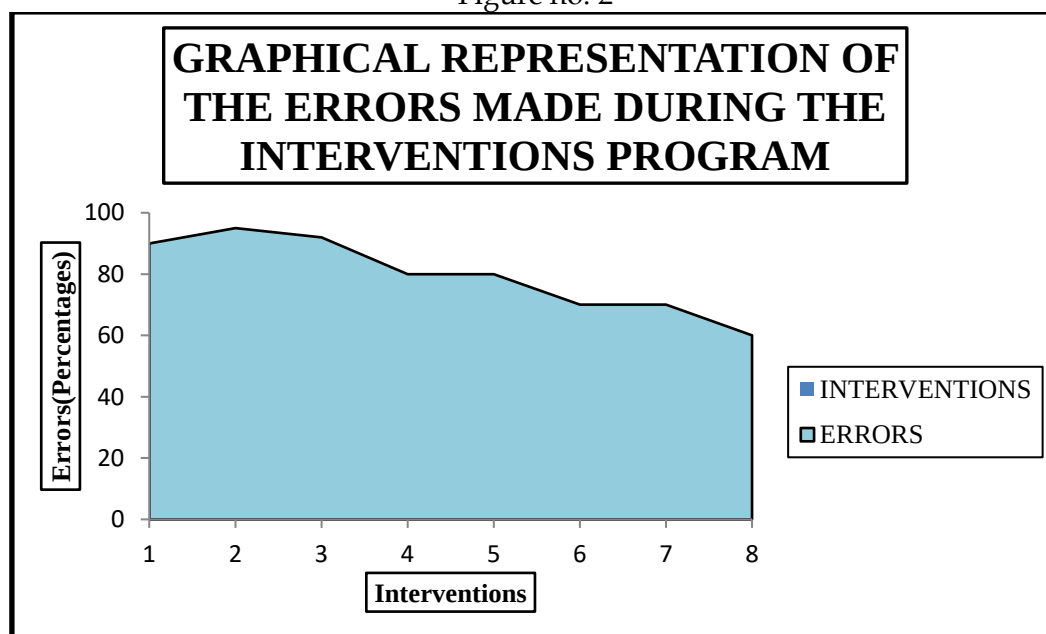
INTERVENTION-4

The fourth intervention was planned in such a manner that the subject is able to improve the reasoning skills of the concepts that have already been established in her mind. The subject is given a geography worksheet of reading comprehension with 8 questions within 30 minutes. This would check the subject's insightful writing, faster reading ability and vocabulary.

POST-INTERVENTION OBSERVATION

It was observed that the subject has shown a lot of improvements. She was able to solve 95% of the questions much before time and also correctly. It can be concluded that the subject has developed her insightful writing; she has a faster reading ability and vocabulary. The subject has a scope of improvement in developing her reading, understanding and integrating skills.

Figure no: 2



Source: Primary Data

INTERVENTION-5

The fifth intervention was planned to understand the perspective of the subject. First the subject is asked about her favorite subject and then an essay is given on that topic within 30 minutes. This would check the creativity, self-expression, critical thinking, and logical reasoning of the subject.

POST-INTERVENTION OBSERVATION



It was observed that the subject was quite innovative and very interestingly she wrote the essay. Her favorite subject is geography and she was given an essay on the physical features of India. She was able to express her point of view; she explained the physical features of India in an innovative manner with drawings and sketches. The subject is quite creative and she was happy to express herself freely. Her essay was quite critical which highlights that she was thinking and was trying to connect her previous and present knowledge. Her time management has also improved.

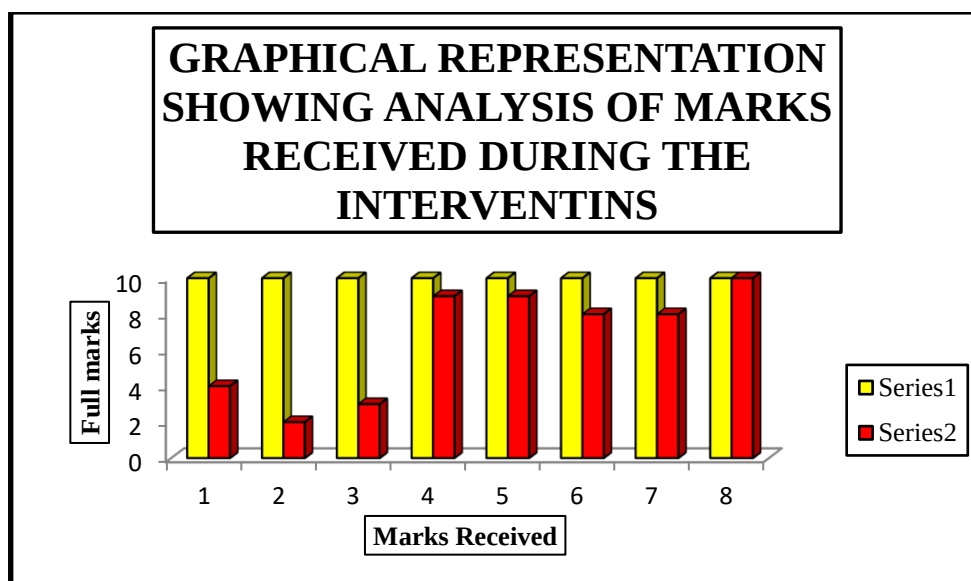
INTERVENTION 6

The sixth intervention was planned to check the self-efficacy of the subject. The subject is asked to solve two geography worksheets of two different chapters within 30 minutes. The subject was allowed to take help from the book. This would check the stressful reaction to the assignments judging the level of self-efficacy in the same context (i.e. academic self-efficacy), resulting in increased psychological distress or not.

POST INTERVENTION OBSERVATION

It was observed that the subject was able to solve both the worksheets within the stipulated time. In worksheet 1, the subject failed to understand one question but rest were all correct. The subject was not in a hurry to solve the worksheets. The subject was not stressful at all which is a positive sign towards progress. It can be concluded that her academic self-efficacy is normal.

Figure no:3



Source: Primary Data

INTERVENTION-7

The seventh intervention was planned to judge the academic procrastination of the subject which is a common symptom of lack of conceptual understanding. The subject is asked to study a chapter and come to school to give an exam of 10 marks within 20 minutes. This would check whether the subject postpones academic assignments or not which can lead to issues like worse academic outcomes and increased stress.



POST-INTERVENTION OBSERVATION

It was observed that the subject was well prepared with her lesson and was able to solve all the questions. The subject was better with objective type questions (fill in the blanks and name the following) than the subjective ones (essay type). The subject did not postpone the academic assignment and it can be concluded that the subject does not fear examination thus showing improvement with zeal, energy and there is no academic procrastination.

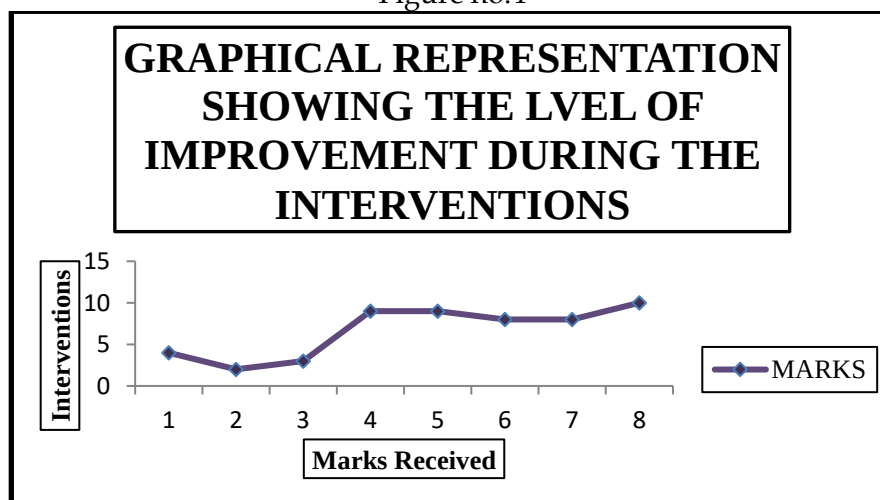
INTERVENTION 8

The final intervention was planned in such a manner so as to check the consistent performance of the subject. The subject was asked to write two conceptual based questions on a favorite chapter of geography of her choice. Since the chapter was an open-ended one, it would enable the subject to choose her likings, plan her thoughts, follow the instructions, study conceptually and express her thoughts freely. The subject was required to follow all the previous intervention, focus on understanding the concepts rather than memorizing and practice rigorously to be able to solve the answers within the stipulated time.

POST INTERVENTION OBSERVATION

It was observed that the subject has followed all the prior information that was given to her. She showed immense improvement. She was able to understand the concept and the type of answers that was expected of the questions. She planned her routine systematically, followed all the instructions, studied conceptually rather than memorizing, revised regularly and expressed her thoughts freely. The consistent performance of the subject is taking her towards a better goal. It will enhance her critical thinking and academic performance.

Figure no:4



Source: Primary Data

The interventions that were given to the students are as follows:-

- Concept mapping.
- Mnemonic.
- Puzzle.
- Worksheet on reasoning skills
- Essay.
- Worksheet judging the level of self-efficacy.



- Examination to judge the academic procrastination.
- Concept based questions to check the consistent performance of the subject.

CONCLUSION

The one month action research program had the intent of attention management with the chosen subject. After having conducted the management program, the interventions have been able to bring about many quantitative and qualitative changes in the subject. There is a gradual fall in time taken and the number of errors made reflecting the quantitative changes, and the positive behavioral changes reflect the qualitative aspect. Even though the qualitative changes cannot be measured, it can remarkably notice in the subject's behaviors and attitude. The subject is not only able to respond in the class but voluntarily participates in the classroom discourses. This was the subject can enhance her critical thinking skills and overall academic performance. Ultimately, the pursuit of excellence in conceptual comprehension is a shared responsibility that propels academic success and lifelong learning.

RECOMMENDATIONS

Visual Aids: Visual aids enhance comprehension and retention. Thus using visual aids like charts, diagrams, and multimedia presentations would help to illustrate complex concepts.

Active Engagement: The students should actively participate in class discussion by asking questions and seeking clarifications. It promotes deeper understanding of the concepts.

Interactive Teaching Methods: Implementing interactive teaching methods, such as group discussions, case studies, project method and hands-on activities would make learning more engaging and help solidify abstract concepts.

Real-World Applications: Demonstrating academic concepts using practical scenarios makes the material more relatable and easier to understand relating theoretical concept to real world.

Feedback Mechanism: Establishing a feedback system where students receive feedback on their understanding of concepts would help them to identify areas for improvement and adjust their learning strategies accordingly.

Personalized Learning Plans: Tailoring teaching approaches to cater to diverse learning styles, providing opportunities for personalized learning plans helps to recognize that each student learns differently.

Use of Technology: To make the concepts crystal clear, teachers must integrate educational technology, such as online simulations, virtual labs, or educational apps, to create interactive and dynamic and realistic learning experiences.



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EXPLORING THE NEED OF INTEGRATING ENVIRONMENTAL SCIENCE AND SUSTAINABLE CITIES IN SCHOOL CURRICULA

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Abstract

UNESCO's goal for 2025 underscores the urgency of integrating environmental education into national curricula worldwide, aligning with the Sustainable Development Goals (SDGs) for 2030. Sustainable Development Goal 11 specifically targets the transformation of cities into inclusive, safe, resilient, and sustainable communities. Students, as active participants, advocate for eco-friendly policies and contribute to practical solutions for waste management, renewable energy, and urban planning. The study assesses students' awareness and engagement with environmental issues, revealing both positive trends and areas for improvement. While a significant portion of students demonstrate familiarity with environmental science, there is a notable gap between theoretical knowledge and practical application, particularly regarding SDG 11. Collaborative efforts involving schools, parents, and media are identified as crucial for instilling environmental awareness in students. The research highlights various initiatives and missions in India aimed at addressing urban environmental challenges, such as Swachh Bharat Abhiyan and Solid Waste Management Rules. Student-led efforts within these programs have resulted in tangible improvements in waste management and environmental conservation. Concrete steps are proposed for advocating environmental science education among students, including raising awareness, community engagement, participation in policy discussions, innovation, leadership, and collaboration with stakeholders. These initiatives aim to equip students with the knowledge, skills, and values necessary for addressing complex environmental issues and fostering a culture of sustainability. Hence, integrating environmental science and sustainable cities into school curricula is essential for cultivating informed and active citizenship committed to environmental conservation and sustainable living. By empowering students to become agents of change, education becomes a powerful tool for shaping a more resilient and environmentally conscious society.

Keywords: *Environmental Education, Sustainable Development Goals, Urban Environmental challenges, Students' awareness, Waste management, Smart City*

INTRODUCTION TO THE STUDY

The youths have designated sustainability their top concern in their quest for a future that is environmentally conscious. They believe on their own behavior as well as how the greater community might influence sustainable growth, which can reduce carbon footprint. As caretakers of the planet, it is up to us to take the greatest care possible to preserve the vibrant and healthy natural world that surrounds humans. A collective



effort from schools cooperating to promote environmental education start with the students and spread across the community.

Recognizing the urgent need to comprehend the global ecological crisis, the education system must instill change in how individuals live, create, consume, and engage with nature. UNESCO's goal by 2025 underscores the imperative inclusion of environmental education in all national curricula worldwide.

Cities face critical environmental destruction due to increasing urbanization. Sustainable Development Goal 11 – “Sustainable Cities and Communities”, part of the 2030 Agenda, focuses on making cities inclusive, safe, resilient, and sustainable. Students play a crucial role, advocating for eco-friendly policies, planning events, and conducting studies on waste management, renewable energy, and urban planning. They contribute to raising awareness and setting examples for creating more livable city environments.

Teaching students the fundamentals of an environmentally sustainable lifestyle, including resource conservation, composting, reduced consumption, sustainable energy use, minimalism, and choosing local organic products, is essential. Integrating these practices into the curriculum equips students with practical skills for personal and generational lifestyle improvement. Moreover, it aligns with the increasing demand in organizations for employees committed to greener living.

Need for the Study

The study underscores the urgency of integrating environmental science and sustainable cities into school curricula to align with global sustainability goals, particularly the Sustainable Development Goals (SDGs). It emphasizes the pivotal role of students in advocating for eco-friendly policies and practical solutions to environmental challenges. However, there's a noticeable gap between theoretical knowledge and its practical application, highlighting the need for hands-on learning experiences. Collaboration among schools, parents, and media is deemed essential for fostering environmental awareness and engagement among students. Integrating environmental education prepares students for future careers in sustainability-related fields and empowers them to contribute to a more sustainable future. Overall, the study emphasizes the importance of a comprehensive approach to environmental education, emphasizing practical application, advocacy, and collaboration to equip students with the knowledge and skills necessary for addressing complex environmental issues and fostering sustainable living.

OBJECTIVES OF THE STUDY

The key objectives of the present study are:

1. To highlight the need of incorporating environmental science and sustainability in school curriculum that mainly concerns the Sustainable Development Goals 2030.
2. To apprehend the environmental problems of modern cities its related Sustainable Development Goal.
3. To analysis the general awareness of students about Environmental Science and Sustainable Cities and to suggest the necessary steps for advocating Environmental Science Education within students
4. To access the progress of Missions regarding management of urban problems in India and the respective role of students.

REVIEW OF LITERATURE

As recent research and efforts show a global emphasis on giving students the information and skills essential to handle environmental concerns, the integration of environmental science and sustainability into school curricula has grown in importance.



UNESCO's Greening Education Partnership (2024) emphasizes how important it is to incorporate environmental issues into school curricula. The effort makes it easier to incorporate sustainability into classrooms throughout the world by introducing resources like the Green School Quality Standards and the Greening Curriculum Guidance. The goal of these initiatives is to raise students' knowledge and encourage environmentally conscious conduct.

The Centre for Science and Environment in India has aligned with the National Education Policy (NEP) 2020 to improve undergraduate environmental education. The Educators Guide to Environmental Studies (2024) by CSE highlights the significance of localized techniques for sustainable development and stresses curriculum design that equips students to handle real-world environmental concerns.

In schools, sustainability education is gaining momentum. For instance, Lessons on developing inclusive education, encouraging critical thinking, and designing sustainable places have been included in the Shree Sarasswathi Vidhyaah Mandheer (SSVM) School of Excellence (2024). Their method emphasizes comprehensive instruction that equips learners to successfully handle urban environmental issues.

Omoogun, Ajayi C, Onnoghen, Usang Nkanu & Ateb, Gertrude Alorye (2014) in their paper *"Adequacy of Knowledge of Environmental Concepts among Junior Secondary School Teachers for the Multidisciplinary Approach of Implementing Environmental Education Curriculum"* found out that the Key attributes of Environmental Education involve fostering awareness, sustained concern, and active engagement in environmental conservation. Deemed essential for every individual in society, the subject employs strategies like analysis, sensitization, and information to instill knowledge that transforms attitudes and values toward the environment. Advocating for the Environmental Education Curriculum (EEC) emphasizes preparing students with a positive environmental outlook. Overall, Environmental Education is considered a viable solution to address environmental problems.

Kumar Sharma, Menon (2018) in their article *"Compulsory Environmental Education in India"* under the umbrella of Global Environmental Education Partnership found out that teachers' motivation and capacity are crucial for successful Environmental Education. In a large country like India, implementing changes poses challenges. Incorporating Environmental Education content into textbooks is pivotal, aligning with existing science and social subjects, ensuring effective pedagogy, and fostering responsible environmental behavior.

Lamanauskas and Makarskaitė-Petkevičienė (2023) in their article *"Environmental Education in Primary School: Meaning, Themes and Vision"* found that the Environmental education is crucial, comprising two components: environmental knowledge/understanding and awareness (skills/habits, responsibility, respect for nature). Students utilize formal methods like subject integration and informal approaches such as talks and projects, conveying knowledge through experiences, active participation, practical activities, and developing understanding.

Rieckamm and Gardiner (2017) in the article *"Education for Sustainable Development Goals. Learning Objectives"* has found that Education for Sustainable Development (ESD) is pivotal for SDGs, fostering cross-cutting sustainability competencies to address diverse challenges and interrelate SDGs. ESD equips learners with specific cognitive, socio-emotional, and behavioral outcomes tailored to each SDG. To enable global action, educational institutions must intensively address sustainable development, nurturing competencies and specific learning outcomes for all SDGs. It's crucial to integrate SDG-related content and employ action-oriented transformative pedagogy. Stakeholders are urged to rethink education to contribute to SDGs by 2030.



The presentation delves into India's Environmental Education syllabus, identifying areas needing urgent attention to raise awareness among the youth about environmental crises. It underscores educating younger generations on sustainable living and responsible resource use, emphasizing curbing consumption, waste reduction, pollution control, and addressing urban challenges. The importance of integrating these concepts into the curriculum, prioritizing practical application alongside theoretical learning, is highlighted for a comprehensive environmental education approach.

Key Concepts

Environmental Studies (EVS) within Indian school curricula is a diverse field spanning multiple disciplines. Its core focus lies in comprehending the environment and the intricate connections between humanity and its surroundings. Covering an extensive range of subjects encompassing both natural and social environments, EVS aims to cultivate environmental consciousness, knowledge, and a sense of accountability among students. In India, it is typically introduced as a mandatory subject in the initial stages of formal education, commonly from primary level education (grades 1-5) onwards. The responsibility of crafting EVS curriculum and textbooks in India rests with the National Council of Educational Research and Training (NCERT). As early as 1930, the Indian education system included environmental aspects, and the Kothari Commission (1964-66) recommended integrating environmental education (EE) into basic education, aligning it with life needs. The report emphasized developing a sound understanding of the environment's facts and principles in primary science teaching. EE spans primary to higher secondary levels, fostering awareness and active participation in problem-solving. Introduced as EVS from class 1, it cultivates positive environmental attitudes from childhood. Utilizing opportunities, NCERT, in collaboration with the Centre for Environmental Education, released "Joy of Learning," a handbook enriching environmental education.

The NCERT curriculum for Environmental Studies in schools covers a broad spectrum of themes, including:

- Earth's physical features, ecosystems, flora, fauna, climate, and natural resources.
- Human activities, communities, cultures, settlements, and the impact of human actions on the environment.
- Personal and community health, sanitation, and hygiene practices.
- Environmental challenges such as pollution, deforestation, water scarcity, waste management, and conservation.
- Biodiversity, protecting endangered species, and sustainable use of resources.
- Climate change, ozone depletion, and international efforts to address environmental problems.
- Civic and Environmental Responsibilities
- Field Trips and Practical Activities like visits to natural habitats, local communities, and parks.

Need for Inclusion of Environmental Science as a Subject in School Curriculum

For the following identified reasons, including Environmental Science in the school curriculum is essential to foster awareness, responsibility, and sustainable practices among students from an early age:

- **Awareness and Understanding:** Teaching environmental science fosters awareness of climate change, pollution, and resource depletion, nurturing informed and responsible citizenship in students.
- **Long-Term Perspective:** By integrating sustainability principles into education, students develop a long-term perspective on global challenges. They understand the interconnectedness of social, economic, and environmental systems, preparing them to contribute positively to a sustainable future.



- **Preparation for Future Careers:** Growing global focus on sustainability demands professionals skilled in environmental science. Integrating it into curricula prepares students for careers in renewable energy, conservation, and environmental policy.
- **Empowerment and Engagement:** Education empowers students as change agents, fostering environmentally friendly behaviors, sustainability advocacy, and positive community changes.
- **Preservation of Natural Resources:** Teaching about sustainability instills values of responsible resource management. Students learn the importance of conserving natural resources, reducing waste, and adopting eco-friendly practices.
- **Interdisciplinary Learning:** Environmental science incorporates aspects of various disciplines, including biology, chemistry, geography, and social sciences. Integrating it into the curriculum promotes interdisciplinary learning, providing a holistic view of environmental issues.

In essence, incorporating environmental science and sustainability into the school curriculum is essential for preparing future generations to address the complex environmental challenges of our world and to cultivate a mindset focused on creating a more sustainable and resilient planet.

Scope of Environmental Studies in School

By studying environmental education, school students have the opportunity to gain a holistic understanding of the environment, preparing them to be informed, engaged, and proactive stewards of the planet. This knowledge can also lead to diverse and fulfilling career opportunities in various environmental fields. Here are some key areas within the scope of environmental studies in school:

1. Exploring the intricate connections between living organisms and their environment, covering concepts like food chains, biodiversity, and ecological balance.
2. Studying causes, impacts, and solutions for environmental challenges.
3. Methods to safeguard diverse species and habitats.
4. Embracing sustainable practices for energy, water, forests, and minerals.
5. Analyzing and managing sources of pollution for air, water, and soil.
6. Balancing economic growth with long-term environmental sustainability and societal well-being.
7. Investigating alternative energy sources for a sustainable future.
8. Understanding legal frameworks guiding environmental protection.
9. Examining moral and ethical considerations regarding environmental responsibilities.
10. Assessing urban planning for minimal environmental impact and improved quality of life.
11. Advocating for environmental awareness and action in communities.
12. Engaging in scientific research for innovative solutions.
13. Exploring diverse careers in environmental fields.
14. Understanding global environmental challenges and international agreements

Environmental education provides a comprehensive foundation for students to grasp the complexities of ecological systems, empowering them to contribute meaningfully to a sustainable future through informed decisions and impactful actions.

Environmental Problems of Modern Cities

Urbanization is rapidly increasing, with over half the world now living in cities—a figure expected to hit 68% by 2050. Environmental challenges in urban areas, particularly pronounced in developing nations and economies in transition, stem from a myriad of issues: inadequate water supply, poor wastewater and solid waste management, energy deficits, loss of green spaces, urban sprawl, and various forms of pollution.



Balancing short-term economic priorities with environmental preservation creates conflicting interests in these settings. Cities significantly impact the environment. Their expansion alters landscapes, affecting ecosystems and biodiversity, while also contributing about 75% of global greenhouse gas emissions.

Urban environmental problems, particularly in developing cities, are escalating, with air quality, noise levels, and congestion standing out as pressing concerns. While developed urban centers have improved industrial and infrastructure-related issues, challenges related to waste from consumption and traffic have grown. Air pollution, largely from transportation and production, is a severe issue, contributing to health problems and approximately 9% of global deaths. Cities consume vast amounts of energy, water, food, and raw materials, generating significant waste and depleting natural resources. This leads to high energy consumption, excessive solid waste, landscape degradation, and impacts on air and water quality in urban ecosystems. Urban water bodies in India, such as the Yamuna River in Delhi, face contamination from industrial discharge, untreated sewage, and garbage dumping. This pollution severely impacts aquatic life and poses risks to human health.

Human activity extensively alters urban landscapes, replacing greenery with concrete, redirecting rivers, and impacting hydrological dynamics, which affects flood occurrences. Urban heat islands are a result of heat absorption and re-radiation from built environments and human activities, elevating temperatures notably in cities compared to rural areas. Delhi, the capital city, faces significant urban heat island effects, especially during summer. Studies have shown temperature variations between urban and rural areas, with urban zones registering higher temperatures. For instance, certain areas in Delhi can have temperature differences of around 2 to 5 degrees Celsius compared to nearby rural regions.

Human influence on the water cycle is evident in urban hydrology, altering surfaces, decreasing infiltration, increasing runoff and erosion, and impacting water quality due to waste and contaminants entering surface and groundwater. Agricultural practices, pollution, air quality changes, and land-use shifts further affect soil quality and precipitation patterns in urban areas.

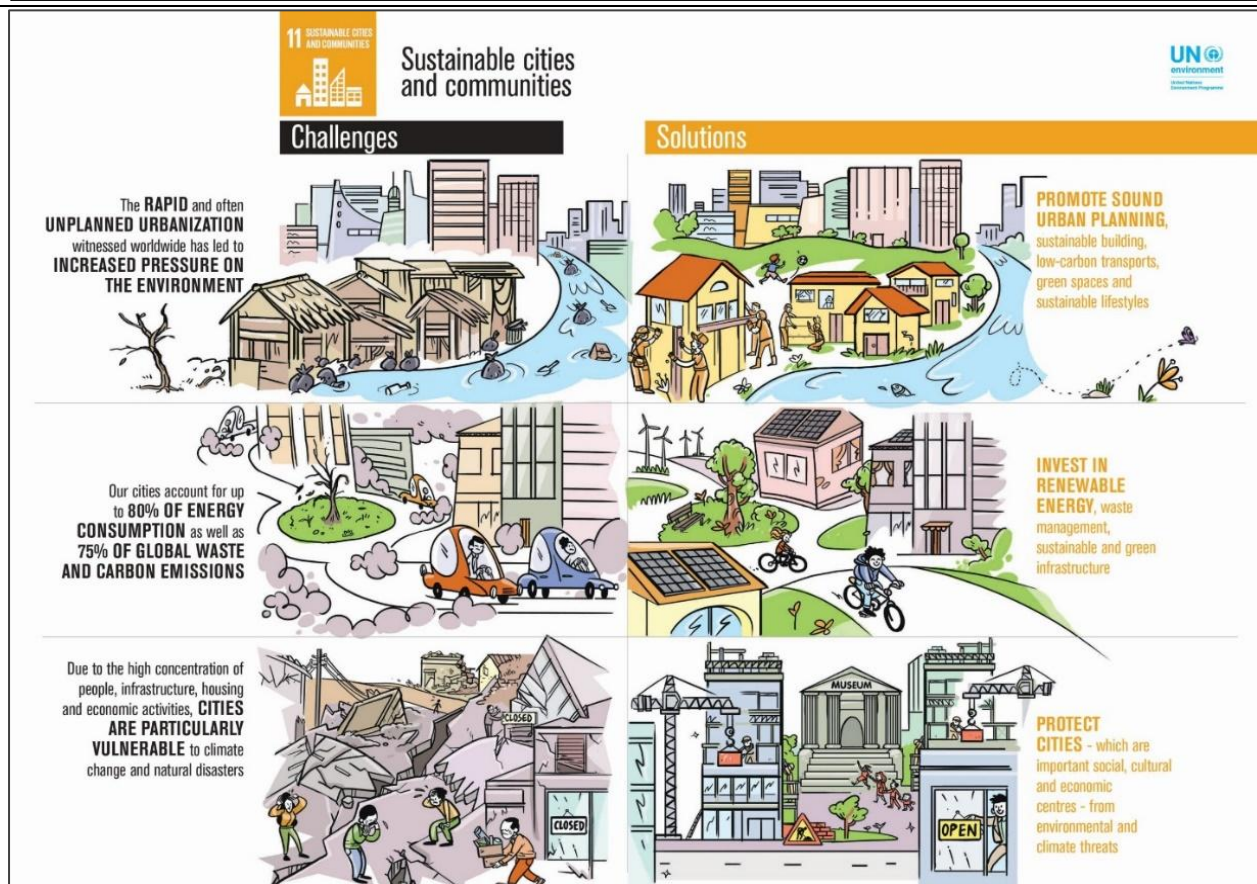
Human actions in urban settings have far-reaching consequences, affecting water resources, soil quality, air, and the overall environment. Balancing urban development with sustainable practices becomes critical to mitigate these impacts and preserve ecological balance.

Sustainable Development Goal #11 – Sustainable Cities and Communities

In the 2030 Sustainable Development Agenda, countries committed to systematically track and evaluate progress towards the Goals and their targets using a set of global indicators. SDG 11 aims to establish inclusive, safe, resilient, and sustainable cities and human settlements.

It inherently integrates environmental considerations, advocating for essential urban infrastructure to prioritize low-emission, resource-efficient, and resilient designs. Improved urban planning and decision-making that focuses on disconnecting, reducing carbon emissions, and detoxifying cities are crucial approaches to fulfilling the aims of SDG 11.

Plate 1: Sustainable Cities and Communities: Challenges and Solutions



Source: United Nations Environment Programme Official Website (Extracted on January 18, 2024)

Research Methodology

The study relied primarily on secondary data collection methods and supplemented this with on-site in-depth interviews and circulation of online forms involving a sample size of 52 present and past-students. Once the data was collected, it underwent organization to conduct a qualitative analysis focusing on the identified issues. To illustrate the findings, cartographic representations were used as a visual aid to depict the analysis effectively.

A Brief Analysis of General Awareness of Students about Environmental Science and Sustainable Cities

Respondents' Profile

Table 1: Percentage-wise Distribution of Respondents

Total Number of Respondents (n=52)	
Male	Female
78.80%	21.60%
Age-wise Distribution	
Below 18	18-25 years
67.30%	32.70%
Residents of the Respondents	



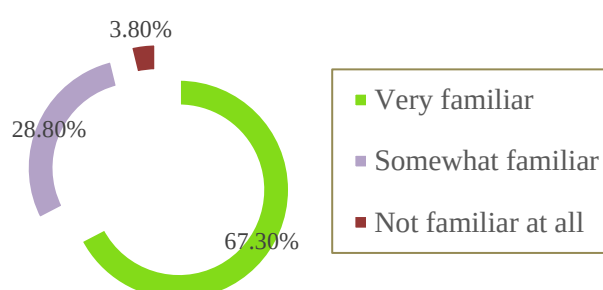
Within KMC		Outside KMC	
78%		22%	
School Boards of the Respondents			
WBBSE/WBCHSE	ICSE/ISC	CBSE	OTHERS
17.30%	48.10%	28.80%	5.80%

Source: Primary Survey, February 2024

Results and Discussion

Figure 1:

Familiarity of Students with Environmental Science as a School Subject



SOURCE: PRIMARY SURVEY, FEBRUARY 2024

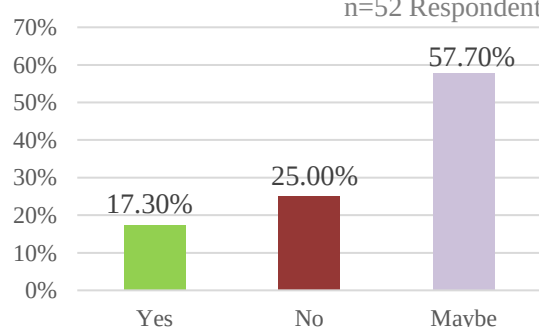
Following a survey of 52 participants, it was discovered that approximately 67% were acquainted with environmental science as a school subject. About 28.8% indicated they were somewhat familiar, while a negligible 3.8% stated they were not familiar at all. Interestingly, respondents aged 18 to 25 were found to be less familiar than their younger counterparts below the age of 18, suggesting a progressive trend in promoting environmental science as a school subject in recent times.

The participants carefully evaluated their board's existing environmental science syllabus, with around 25% expressing dissatisfaction, deeming it incomplete and deficient in crucial environmental topics. Among all respondents, approximately 57.7% believed there was an inadequate equilibrium between theoretical understanding and hands-on experience in environmental science education and about 17.3% felt satisfied with the current curriculum of Environmental Science and its education. This data underscores the preference for a more practical approach, emphasizing that environmental science should extend beyond a solely exam-oriented subject in schools.

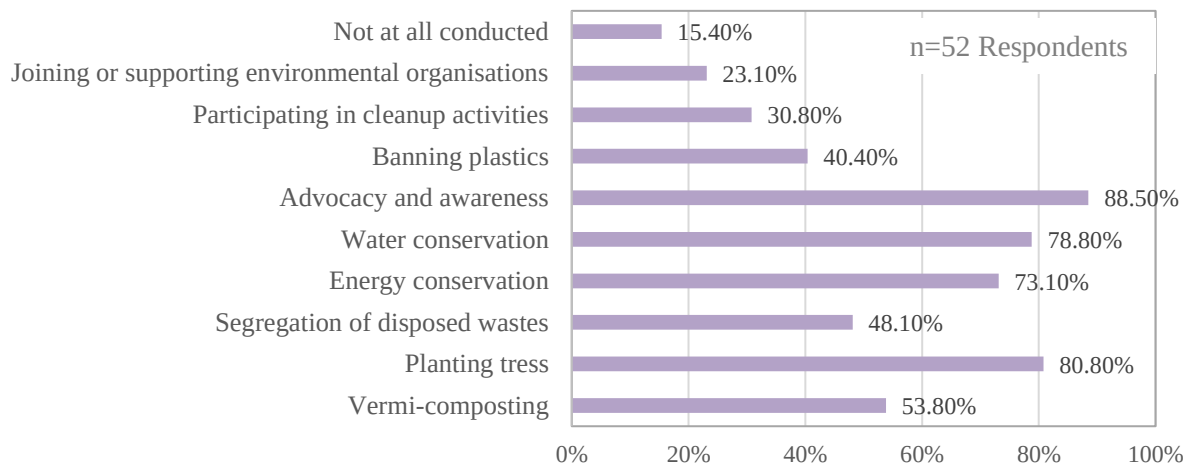
Figure 2:

Appropriateness of Environmental Science Syllabus in School Boards

n=52 Respondents

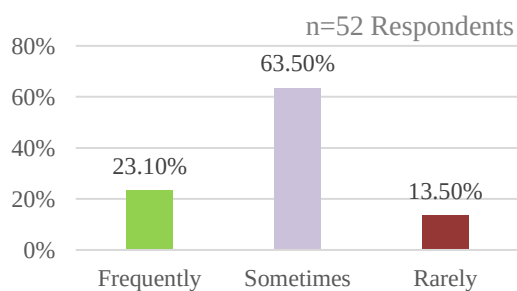


SOURCE: PRIMARY SURVEY,

**Figure 3: Types of Environmental Conservation Practices conducted in Schools**

Source: Primary Survey, February 2024

A list of environmental conservation practices conducted by various schools were laid in front of the respondents, yielding highly positive results. The study revealed that 88.5% of schools endorse Environmental Science, promoting awareness. Notably, 78.8% and 73.1% of schools advocate water and energy conservation, while 80.8% actively practice and promote tree planting. Various other conservation methods, such as vermicomposting, waste segregation, and joining environmental organizations, are widely embraced. However, 15.4% of respondents acknowledged that some schools do not engage in such conservation practices.

Figure 4: Frequency of Recycling Products practiced by Students at Home and School

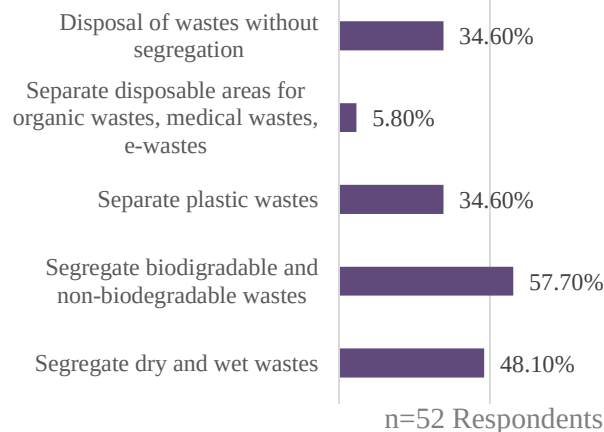
SOURCE: PRIMARY SURVEY,

Approximately 23% of respondents mentioned regularly engaging themselves in recycling goods at home and school, expressing a positive view, while around 13.5% rarely practiced it. A significant majority, accounting for 63.5%, demonstrated a moderate level of commitment to recycling. This suggests potential for enhancement, indicating the need to encourage more students to embrace recycling practices and conserve resources.



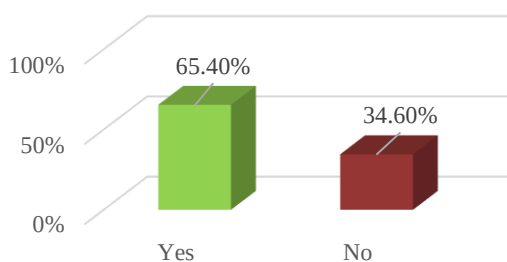
Given the colossal scale of waste generated in cities, it becomes crucial for students to grasp various waste segregation methods. The respondents exhibited a moderately positive inclination toward waste segregation, with approximately 57.7% separating biodegradable and non-biodegradable wastes. Additionally, 48% engaged in the segregation of dry and wet waste, while 34.6% practiced the separation of plastic waste from other types. However, 34.6% demonstrated negative results by not disposing of waste through segregation, highlighting the need for improvement and increased awareness.

Figure 5: Ways of Waste Segregation Taught by Schools



SOURCE: PRIMARY SURVEY, FEBRUARY 2024

Figure 6: Students' Awareness about Sustainable Development Goals related to Sustainable Cities



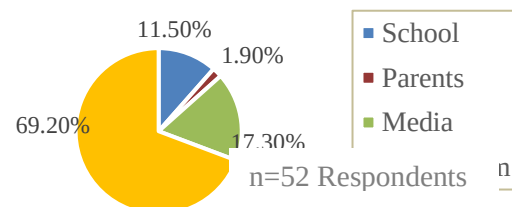
SOURCE: PRIMARY SURVEY,

The integration of Sustainable Development Goals into students' daily lives is crucial, yet there exists a significant gap between theory and practice.

Approximately 65.4%, has a rough understanding of SDGs, particularly focusing on SDG number 11, which pertains to "Sustainable Cities and Communities." While the rest, were uninformed about it.

In conclusion, the study assessed students' perceptions regarding the significance of various entities in promoting environmental science and sustainable cities. The results revealed that the majority (69.2%) acknowledge the crucial roles of schools, parents, and media collectively. Specifically, 17.3% emphasize the media's importance, 11.5% highlight the role of schools, and a minimal 1.9% attribute significance to parents. This underscores the importance of a collaborative effort involving schools, media, and parents to instill environmental awareness in students and foster informed citizenship.

Figure 7: Students' perception on Role of various agents in teaching Environmental Science and Sustainable Cities



SOURCE: PRIMARY SURVEY, FEBRUARY



Missions related to the Management of Urban Problems in India and the Role of Students

The management of environmental problems in India involves strategic initiatives to address challenges like pollution, housing, waste, and traffic, where students play a vital role in driving awareness and sustainable change.

Swachh Bharat Abhiyan (Clean India Mission): Launched in 2014, this nationwide campaign aims to eliminate open defecation and improve solid waste management practices across urban and rural areas. It focuses on building toilets, promoting waste segregation, and ensuring proper waste disposal. Over 4,000 educational institutions across India participated in cleanliness drives during the Swachh Bharat Summer Internship program. Students organized over 1.5 lakh cleanliness drives in schools and communities during certain years, resulting in the cleaning of millions of kilometers of streets and public spaces. Many schools and colleges organized competitions, debates, and workshops centered on cleanliness and sanitation, involving thousands of students. Student-led initiatives in various states resulted in the construction of toilets, installation of waste bins, and significant improvements in waste management practices in local communities.

Solid Waste Management Rules (2016): The Government of India revised the Solid Waste Management Rules in 2016 to emphasize waste segregation at the source, efficient collection, transport, and disposal of waste. It encourages recycling and promotes the concept of Extended Producer Responsibility (EPR). Thousands of schools and colleges have integrated waste segregation and management into their curriculum and extracurricular activities. Student-led initiatives and campaigns have led to the segregation and proper disposal of tons of waste, significantly reducing the amount of waste sent to landfills. Numerous student-driven programs have focused on educating communities, resulting in increased awareness and adoption of sustainable waste management practices.

Pradhan Mantri Gram Sadak Yojana (PMGSY): This scheme focuses on improving rural connectivity and includes provisions for rural waste management and construction of solid and liquid waste management infrastructure in villages.

Waste-to-Energy Projects: Initiatives to convert waste into energy have been encouraged. Projects involving the generation of energy from municipal solid waste aim to address the issue of landfill overflow while producing renewable energy.

National Clean Air Programme (NCAP): While not solely focused on waste management, the NCAP aims to control air pollution by reducing particulate matter. Waste burning is one of the targeted sources of pollution addressed in this program.

Smart Cities Mission: Under this mission, several cities have adopted innovative waste management solutions, including decentralized waste processing, efficient collection systems, and technology-driven approaches for waste disposal.

Clean Ganga Mission (Namami Gange): This initiative focuses on rejuvenating the Ganges River and includes efforts to address solid and liquid waste management along the river banks.

Recommendations for advocating Environmental Science Education amongst Students

Environmental education empowers students to raise awareness about waste issues, assisting communities in collection, sorting, and safe disposal. Educating about biodegradable and recyclable waste, they contribute to



wider society's well-being. Students maintain cleanliness in schools, promoting proper disposal of solid waste like plastic and paper in classrooms and beyond.

1. **Advocacy and Awareness:** Students can raise awareness among their peers, families, and communities about environmental issues in cities. They can organize campaigns, workshops, games and other events to educate others about the importance of environmental conservation and sustainable practices. Celebrating important days and assemblies in school related to environmental conservation, such as Earth Day, Environment Day, Water Day and so on can bring about a positive attitude in students about conservation of the earth's resources.
2. **Community Engagement:** Students can actively engage with local communities to initiate and participate in clean-up drives, tree planting initiatives, and recycling programs. They can encourage community involvement in environmental conservation efforts.
3. **Participation in Policy:** Students can advocate for environmentally friendly policies in their cities by engaging with local governments, participating in town hall meetings, and voicing their concerns about issues like pollution, waste management, green spaces, and sustainable transportation.
4. **Innovation and Solutions:** Students often bring fresh perspectives and innovative ideas to the platform. They can develop and implement solutions to tackle environmental challenges, such as proposing eco-friendly alternatives, participating in hackathons or competitions focused on sustainable urban development, or initiating projects that promote renewable energy sources.
5. **Education and Leadership:** Students can lead by example, demonstrating sustainable practices in their daily lives. They can also inspire and mentor others, such as their family and peers, to adopt eco-friendly habits and become leaders in environmental conservation.
6. **Collaboration and Networking:** Students with the help of schools can collaborate with environmental organizations, NGOs, and other stakeholders to amplify their impact. Networking with like-minded individuals and groups can lead to greater collective efforts in addressing city-related environmental problems.

CONCLUSION

The integration of environmental science and sustainable cities into school curricula is a vital initiative highlighted in a recent study, emphasizing the increasing concern among youth for environmental sustainability. The study's objectives stress the urgency of incorporating environmental science into school curricula, analyzing city ecology concerns, understanding the roles of teachers and parents, and proposing practical activities for students. The literature review reinforces the global consensus on the significance of environmental education, showcasing diverse strategies used worldwide to tackle environmental challenges.

The research method, utilizing a mix of secondary data and on-site interviews, analyzes the current state of environmental education in schools, particularly in India. Findings unveil positive and concerning aspects of students' awareness and engagement with environmental issues, emphasizing the need for a more practical approach in the curriculum.

The study sheds light on environmental challenges in modern cities, emphasizing the pivotal role of students in advocating for sustainable urban development. It points to a gap between theoretical knowledge, especially related to Sustainable Development Goal 11, and its practical implementation in students' lives.

The analysis of students' perceptions and practices regarding environmental conservation indicates a positive trend but also highlights areas for improvement. The study stresses the importance of collaborative efforts involving schools, parents, and media to instill environmental awareness in students.



In conclusion, the study outlines concrete steps for promoting environmental science education among students. It underscores the role of students in raising awareness, community engagement, participating in policy discussions, contributing innovative solutions, leading by example, and collaborating with stakeholders. Initiatives like Swachh Bharat Abhiyan and Solid Waste Management Rules in India exemplify the impact of student-led efforts in addressing environmental challenges.

Ultimately, the study emphasizes the urgency of integrating environmental science and sustainable cities into school curricula to equip students with the knowledge, skills, and values necessary for addressing complex environmental issues. The goal is to foster a generation of informed and responsible citizens committed to environmental conservation and sustainable living.

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ANALYZING THE IMPACT OF HALLYU ON HIGH SCHOOL STUDENTS

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Abstract

This research explores the multifaceted impact of Hallyu (the Korean Wave) on high school students, focusing on diverse aspects of their lives. Findings reveal Hallyu's influence on social media engagement, travel aspirations, creative pursuits, fashion choices, beauty standards, language learning, and media consumption habits. Factors attracting students include novelty, youth-centered themes, idol culture, visual appeal, and accessible platforms. Negative impacts include distraction from studies and excessive screen time. Positive outcomes involve self-discovery, creative inspiration, boosted confidence, and inspirational role models. The discussion suggests integrating Hallyu into education while addressing concerns through media literacy programs. The study emphasizes the need for balance and proactive measures, considering the complex interplay of positive influences and challenges in integrating Hallyu into high school environments. The research contributes to understanding Hallyu's role in shaping high school experiences, highlighting the need for a balanced educational approach.

Keywords: Multifaceted Impact, Social Media Engagement, School Environments, Positive Influence

INTRODUCTION

In an era defined by the interconnectedness of global cultures, the Korean Wave, or Hallyu has emerged as a vibrant and influential cultural phenomenon transcending borders. Originating from South Korea, Hallyu encompasses a diverse array of cultural exports including K-pop, K-dramas, films, and fashion. As this phenomenon permeates societies worldwide, its impact on high school students has become a captivating area of study. This research seeks to undertake a comprehensive exploration of the multi-faceted dimensions of Hallyu's influence on high school students, with a particular focus on fan culture and the burgeoning fandom among high school students. As we embark on this exploration, it is imperative to define the key elements that constitute Hallyu, such as K-dramas, K-pop, and fan culture while also understanding the unique context of high school students as a demographic that is actively shaping and being shaped by this cultural phenomenon.

Defining Hallyu: Hallyu refers to the explosive popularity of Korean pop culture through Korean music, movies, food, fashion, hairstyles, cosmetics, and other products (Li, 2005; Hanaki, Singhal, Han, Kim, & Chitnis, 2007). The phrase was coined by a Chinese newspaper, Beijing Youth Daily, in late 1999 (Kim, 2013, March 17), referring to the rise in popularity of South Korean pop culture (Lee, 2008). Hallyu is a transnational phenomenon that has an avid following not only within Korea but also all over the world, appearing in new international media scenes: Its global emergence has been described as a "cultural tsunami" and expressed in words such as "explode," "sweeping," and "struck" that describe the vigor and the surge of cultural products and its resulting popularity (Han & Lee, 2010; Hanaki, Singhal, Han, Kim, & Chitnis, 2007; Ravina, 2009)



Hallyu encompasses a diverse array of cultural exports, including K-pop music, K-dramas (Korean Dramas), films, fashion, and more. At its core, Hallyu represents a dynamic blend of Korean traditional elements with contemporary global trends. The allure of Hallyu lies in its ability to transcend linguistic and cultural barriers, creating a shared cultural experience that resonates with people across the globe.

History of Hallyu: The term Hallyu was first developed as a pun and double entendre of the term "han-liu", or literally "cold wave" by the Chinese to symbolize the sudden and forceful onslaught of the wave of the Korean media into the Chinese market (Ravina, 2009). The word Hallyu is currently used in particular to refer to two predominant types of media products reflecting Korean popular culture: television drama series (a.k.a. K-drama) and Korean popular music (a.k.a. K-pop).

K-dramas and K-pop- Two prominent pillars of Hallyu are K-dramas and K-pop, each contributing to the global fascination with Korean entertainment.

K-dramas are television series characterized by intricate storylines, compelling characters, and a unique blend of genres. They often explore themes of love, friendship, family, and societal issues. K-dramas have gained international acclaim for their high production quality and the ability to evoke a wide range of emotions. High school students, in particular, find relatable narratives in K-dramas that mirror their own experiences of love, friendship, and self-discovery.

K-pop refers to a global phenomenon of Korean pop music. With its infectious beats, impressive choreography, and visually stunning music videos, K-pop has taken the world by storm. Iconic groups and solo artists have garnered dedicated fanbases worldwide, contributing to the globalization of Korean popular culture. High school students are particularly drawn to the catchy tunes and charismatic performers, and actively engage with K-pop not only as listeners but also as participants in the vibrant online and offline fan communities.

The current scale of K-pop expansion was simply unimaginable during the periods before the social media explosion. As Chloe and Russell write: The Korean Wave has long conquered Asia, but before the proliferation of global social networks, attempts by the K-pop stars to break into Western markets, including the U.S. failed. But now, YouTube, Facebook, and Twitter make it easier for K-pop bands to reach a wider audience in the West, and those fans are turning to the same social networking tools to proclaim their devotion. (Chloe and Russell 2012)

High school students and Identity formation: High school represents a pivotal journey of identity formation. It's a time when individuals explore their interests, passions, and cultural affiliations, seeking to carve out a distinct identity within the tapestry of society. Hallyu, with its kaleidoscopic offerings, becomes a palette for high school students to paint their cultural canvases. It provides a medium through which they express their individuality, connect with their peers who share similar interests, and navigate the intricacies of adolescence.

As high school students immerse themselves in the world of Hallyu, they engage not just with the content but with the cultural ethos it represents. Whether it's adopting Korean beauty standards, emulating K-pop fashion trends, or even incorporating Korean phrases into their lexicon, Hallyu becomes an integral part of the multifaceted identity construction process during adolescence.

Fan culture and rising fandom: Fan culture, an integral part of Hallyu, encompasses the passionate and participatory engagement of fans with Korean cultural products. This goes beyond mere fandom and extends into a dynamic cultural phenomenon where fans actively shape and contribute to the narrative of their beloved idols and shows.



The rising fandom among high school students is a noteworthy aspect of Hallyu's impact. It transcends traditional notions of fandom, involving active participation in fan communities, attendance at concerts and events, and the creation of fan-generated content. The communal nature of Hallyu fandom fosters a sense of belonging and shared identity among high school students, contributing to the formation of distinct subcultures within the larger cultural landscape.

Fan culture, driven by passionate and dedicated fan communities, brings numerous positive impacts to high school students, providing a sense of community and shared interests. Engaging with fandoms can enhance social connections, allowing students to connect with peers who share similar passions, and fostering a sense of belonging and friendship. Fan culture also serves as a creative outlet for students, encouraging artistic expression through fan art, fan fiction, and other forms of creative engagement. Moreover, the enthusiasm and support within fandoms can contribute to a positive and uplifting atmosphere, creating a supportive space for self-exploration during the formative years of high school.

While fan culture can be a source of positivity, it also presents challenges that may negatively impact high school students. The intensity of fandoms can sometimes lead to exclusionary behaviors, creating divisions between those within and outside specific fan communities. The pressure to conform to certain fan expectations and preferences may result in stress and anxiety for students who feel compelled to align with popular opinions within their chosen fandoms. Additionally, online interactions within fan communities can expose students to potential cyberbullying and toxic behavior, negatively affecting their mental well-being. The phenomenon of "fan-entitlement" can be particularly detrimental, as high school students might develop demanding and unrealistic expectations. This could result in disappointment and criticism when the content does not align with their preferences, impacting their overall enjoyment and experience.

As high school students navigate the intricate dynamics of fan culture, striking a balance between passionate engagement and maintaining respectful boundaries becomes crucial.

Need of the study

This research endeavors to fill a significant void in the current body of knowledge by undertaking a comprehensive examination of the impact of Hallyu on high school students. Despite the global prominence of Hallyu and its pervasive influence on youth culture, there exists a scarcity of in-depth studies that holistically explore its implications in cultural, social, and educational dimensions for adolescents. This study attempts to address this gap, contributing substantially to academic scholarship and enhancing our comprehension of how Hallyu shapes the experiences of high school students within the dynamic context of a globalized cultural landscape.

REVIEW OF LITERATURE

A review of literature is a comprehensive and critical summary of existing scholarly works, articles, books, and other resources that are relevant to a particular topic or research question. The main objectives of reviewing literature related to the topic of research were as follows:

- To provide a comprehensive overview of existing literature to establish the broader context of the research.
- To identify gaps or limitations in current research to pinpoint areas where additional investigation is needed.
- To evaluate methodologies used in previous studies to inform the selection of appropriate research methods for the new study.



- To justify the significance of the new research by demonstrating how it addresses identified gaps and contributes meaningfully to the existing body of knowledge.

The research on Hallyu has expanded across various disciplines, examining its cultural, social, and psychological impacts. While much has been written about Hallyu's global appeal, research focusing specifically on its influence on high school students, especially in the Indian context, is limited.

Impact of Korean Genres of Entertainment in India

Recent studies highlight the rapid rise of K-pop and K-dramas in India, particularly among youth. According to Bose (2020), the accessibility of platforms like YouTube and Netflix has made K-pop and K-dramas highly popular, leading to increased cultural exchange between Korea and India. The influence of K-pop has also been seen in the fashion choices and language of high school students, with many adopting Korean phrases and styles (Sharma, 2021)

Studies on cultural impact and realism in Korean dramas

The rise of the Korean Wave is nothing more than a product of its time, and Korean culture meets the needs of the spirit and popular cultural psychology of the era. Many experts agree on this point, as XuChengning writes that Korean dramas focus on the realism of everyday life. They are as close to real life as possible, with detailed depictions of family life, love and affection, and a sense of originality.

In Xu Haoran's paper, he mentions that the psychology of popular culture has contributed to the spread of Korean culture, and the theory of "use and satisfaction" mentioned therein can reflect the audience's psychology very well. First, the psychological satisfaction of entertainment craving. The stress of life has become one of the reasons for people's tension, and K-pop culture can combine modern images with funny and humorous music and dance to make people change their emotions and get entertainment satisfaction during tension. In addition, the audience's herd mentality is also a psychological state that should not be underestimated in the spread of K-pop culture. When K-pop becomes a trend among young people, there will be more and more people with a curiosity to learn about K-pop.

Studies of the Hallyu wave on global consumption:

Today K-pop bands like BTS, BLACKPINK, MAMAMOO, and TXT attracting millions of audiences around the world; Movies like Parasite, The Host, and Train to Busan gaining critics' attention; Korean food like Kimchi, Bibimbap, and Bulgogi, and drinks like Soju, Bokbunja ju being served in all corners of the globe, the craze for Korean things is like never before. For the popularity of Korean things, the credit should be given to the fans and supranational fandoms that actively act as ambassadors and facilitators of Korean culture among their acquaintances and thus play a crucial role in spreading the Hallyu wave (Bok-rae, 2015; Otmagzin & Lyan, 2014).

Cultivation theory and the long-term effects of Korean Media Consumption:

Cultivation theory / Cultivation Analysis was proposed by George Gerbner. This theory argues that media especially television presents exaggerated and unreal images, as a result of which people perceive the real world through television's perspective. They think of the world as displayed on the television. As television offers many ideas, the continuing consumption of television over a long time cultivates specific values, beliefs, attitudes, and desires in people, which shapes their perception of the world. It means that media consumption leads to the shaping of people's mindsets (Gerbner, 1998). Hence the long-term effects of Korean media consumption in the case of Hallyu wave can be understood with the help of cultivation theory. There is a



possibility that the transnational audience might develop a different attitude, picture, imagery, and ideology about anything portrayed in popular cultural products such as Korean culture, Koreans, and Korea. For example, a positive image of Korea is constructed among the audience of K-pop culture makes them visit Korea, and buy Korean products (Jung, 2016; Trolan, 2017).

Studies on digital literacy and online interaction:

The internet has become children's and teenagers' first choice for interactions. As a result, children and teenagers have more time and opportunities to surf on the internet. They also have become one of the most vulnerable groups of people to the negative impacts of digital technology. Teenagers characterized by their curiosity and immaturity can easily plunge into doing negative things on social media; one of which is cyberbullying (Saripah & Pratita, 2018). Meanwhile, the study by Rinata & Dewi (2019) showed that age plays an important role in responding to hoaxes about their idols. Maturity and experience are the important aspects of making one wiser in using social media. Based on the findings of previous research, it can be assumed that teenage K-pop fans who often make online interactions have no sufficient digital literacy. Cyberspace can be inhibited by people from all ages and backgrounds allowing them to interact with anyone. This can cause adults, teenagers, and children to be prone to negative treatment or even become perpetrators themselves.

The impact of popular dramas diffused South Korean culture into daily culture in foreign countries and invited several tourists who wanted to experience traditional foods in South Korea. The ways of thinking and living expressed in Korean dramas influenced the viewers to increase their consumption of Korean foods and goods (Jang and Paik, 2012: 201).

Cultural proximity theory in the success of Hallyu:

Cultural proximity: Joseph D. Straubhaar proposed the cultural proximity theory in 1991. This theory states that audiences are more likely to select products from their own culture or countries similar to theirs. The audience opts for the local media content because of the identifiable cultural content and language. If the local media is unable to deliver the content desired by the audience, they would prefer a country that's proximate to their native country in terms of language, culture, and geography. Straubhaar argues that it is due to the presence of a certain set of cultural offerings that the audience experiences cultural proximity and identifies with the media content. These can include language, customs, ethnic appearances, and values (Straubhaar, 1991).

Identity Formation and Socialization:

Adolescents often turn to entertainment as a means to experiment with different aspects of their identity. Studies by Tiggemann and Slater (2014) suggest that media, including music and film, offer idealized representations of the self, which young people may try to adopt. In the context of Hallyu, these representations are often highly stylized, showcasing beauty, fashion, and personal success. The immersion in such portrayals can inspire youth to incorporate elements of these representations into their self-image. In particular, the highly polished images of K-pop idols and K-drama characters contribute to the visual appeal of Hallyu, encouraging youth to explore their personal identity through similar means of fashion and appearance.

In conclusion, the literature review has shed light on existing gaps in research particularly in the Indian context, about high school students. Recognizing these gaps, this study aims to contribute significantly by focusing on the specific demographic of high school students in Kolkata. By narrowing the scope to this region, the research seeks to provide a nuanced understanding of the impact of Hallyu on adolescents within the unique cultural and educational context of Kolkata. Through this targeted approach, the study aspires to offer



valuable insights that can fill the identified research gaps and contribute meaningfully to the broader understanding of the influence of Hallyu on high school students in India.

METHODOLOGY

The methodology of research refers to a systematic approach or framework used to conduct a research study. It outlines specific procedures, techniques, and tools employed to gather, analyze, and interpret data. A well-designed methodology is crucial for ensuring the reliability, validity, and rigor of research findings. The sampling technique, followed by steps or procedure of data collection, the tools required, and the statistics used are mentioned below:

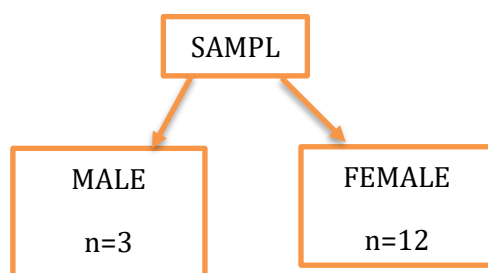
Objectives:

1. To determine which aspects of a high school student's life are impacted by Hallyu.
2. To determine the factors of attraction to Hallyu.
3. To identify possible negative impacts of Hallyu.
4. To identify possible positive impacts of Hallyu.

Sampling Technique:

Convenience sampling was used to collect data for the present study. Convenience sampling is a sampling technique where researchers select individuals for a study based on their ease of access and availability. In other words, participants are chosen because they are convenient to reach, rather than being selected through a random or systematic method. Data for the present study was collected between December 25th to 30th 2023. During Christmas break when educational institutions were closed, data collection involved reaching out to students from different schools in Kolkata, both from Bengali-medium and English-medium backgrounds, aged between 16 and 18 years. The selection was based on the ease of obtaining their contact information.

Sample:



The sample comprised 15 students, consisting of 5 boys and 10 girls, with a gender composition that reflects a balance between male and female students. The students' socioeconomic backgrounds varied, with 45% from upper-middle-class backgrounds, 35% from middle-class backgrounds, and 20% from lower-middle-class backgrounds.

Inclusion Criteria for the sample:

Inclusion criteria for the sample encompassed high school students aged between 16 and 18, enrolled in classes X, XI, and XII. Data collection was conducted via Google Forms, with a mandatory requirement for respondents to sign in via a Google account to ensure the authenticity of their responses. Consequently, only individuals with a Google account were eligible for inclusion in the sample. Additionally, upon reopening of their schools, a consent form was distributed, necessitating parental signatures for minors among the participants.



Procedure for Data Collection:

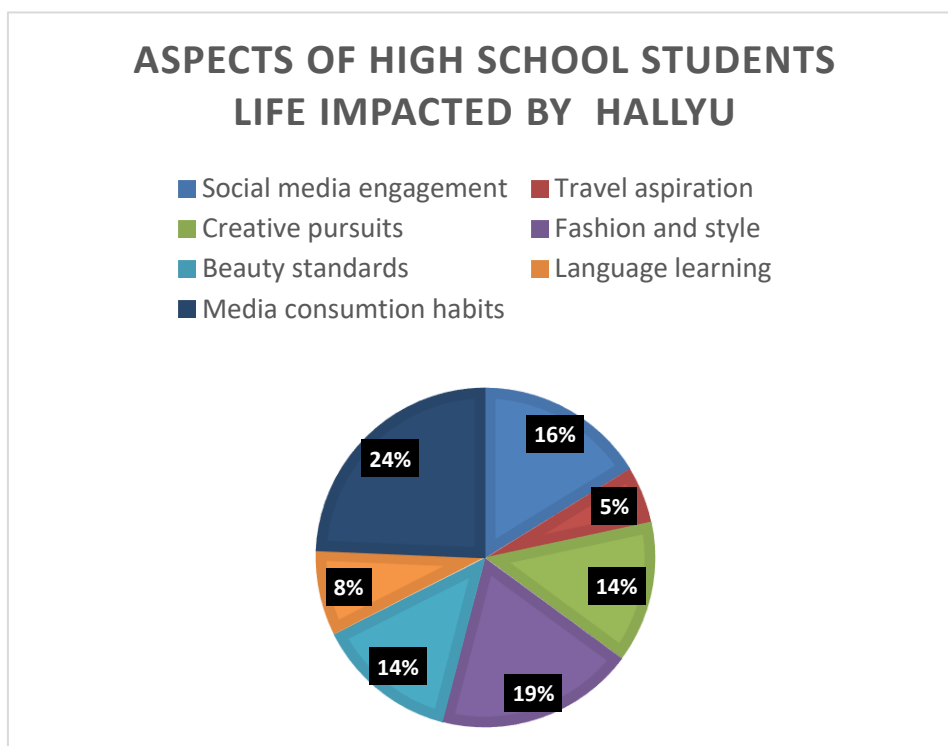
The data collection process commenced with the preparation of an Information Schedule containing a set of open-ended questions addressing personal details and Hallyu engagement. High school students aged 16-18, enrolled in classes X, XI, and XII were conveniently sampled during the Christmas break from various schools in Kolkata. Google Forms served as the platform for administering the schedule and the participants were required to sign in via a Google account to ensure response authenticity. Following Christmas break, a consent form was distributed with parental signatures obtained for participants under 18. The interviews encouraged participants to share their experiences with Hallyu. Responses were collected via Google Forms and the subsequent compilation facilitated further study.

Tool Used:

Information Schedule: Data collection was facilitated through the use of an Information Schedule. This schedule comprised open-ended questions designed to gather personal information and insights related to participants' engagement with Hallyu as well as its impact on them.

Statistics: Percentage has been used.

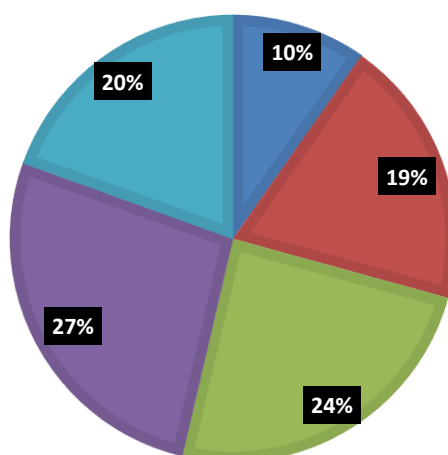
RESULTS





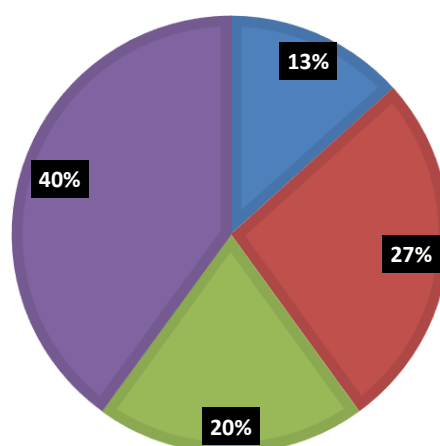
FACTORS OF ATTRACTION TOWARDS HALLYU

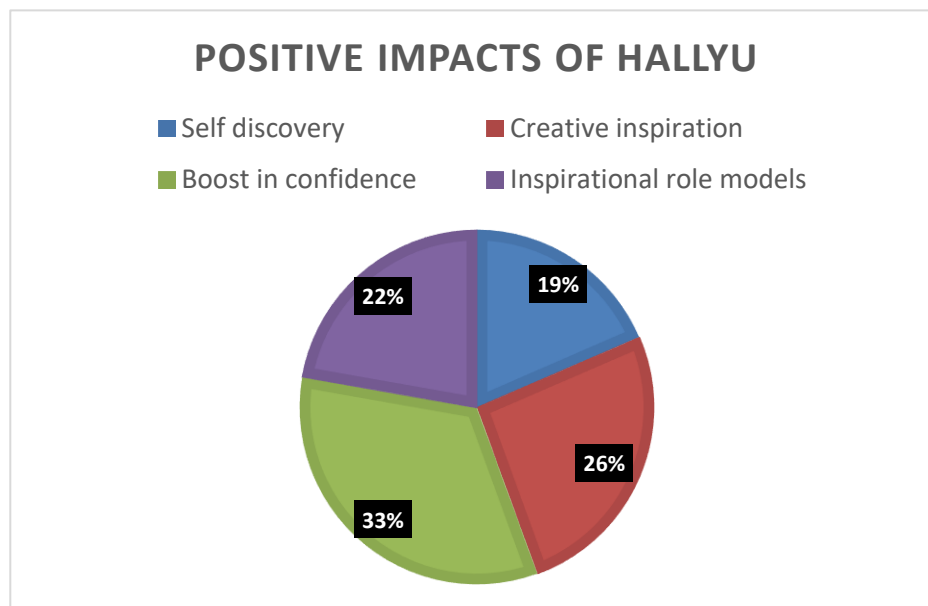
- Novelty
- Youth centric themes
- Idol fandom culture
- Visual appeal
- Accesible platforms



NEGATIVE IMPACTS OF HALLYU

- Distraction from studies
- Excessive screen time
- Over emphasis on appearance
- Unrealistic expectations





Summary of the results:

The research findings reveal various aspects of high school students' lives that are impacted by Hallyu:

- Social media engagement is influenced by Hallyu, with 16% of respondents indicating that Korean entertainment affects their online interactions.
- Travel aspirations are impacted to a lesser extent, with 5% of students expressing that Hallyu contributes to their desires for exploration and experiencing different cultures.
- Hallyu has a notable influence on creative pursuits as 14% of high school students find inspiration for their artistic endeavors from Korean entertainment.
- Fashion and style choices are significantly impacted with 19% of students stating that Hallyu plays a role in shaping their personal fashion preferences.
- Beauty standards are influenced by Hallyu content as 14% of respondents express that Korean entertainment affects their perceptions of beauty.
- Language learning is impacted to a lesser degree, with 8% of students incorporating Korean language learning into their interests influenced by Hallyu.
- Hallyu has a substantial impact on media consumption habits, with 24% of respondents indicating that Korean entertainment plays a significant role in shaping their media choices.
- English-medium students were more heavily engaged with Korean entertainment, with 68% of the total respondents from English-medium schools indicating frequent consumption of K-pop, K-dramas, and related content.
- On the other hand, Bengali-medium students accounted for 32% of the sample and showed comparatively lower engagement, often relying on free or fan-translated content.
- 80% of the boys preferred K-pop music and esports content, whereas 70% of the girls favored K-dramas and were influenced by Korean beauty and fashion trends. Female students also demonstrated greater involvement in creative fan activities such as fan art.

In terms of factors that attract high school students to Hallyu:

- Novelty is a motivating factor, with 10% of students drawn to Hallyu content due to its unique and novel charms.



- Youth-centric themes resonate with 19% of respondents, indicating that the content's focus on youth experiences is appealing.
- Idol culture plays a significant role in attracting high school students to Hallyu, with 24% expressing their connection to the fan culture surrounding Korean idols.
- Visual appeal is a major factor, with 27% of students drawn to Hallyu content due to its visually captivating nature.
- Accessible platforms contribute to Hallyu's popularity, as 20% of students find it easily accessible through OTT.

Regarding the negative impacts of Hallyu on high school students:

- Distraction from studies is a concern as 13% of respondents report that Hallyu content negatively affects their academic focus.
- Excessive screen time has a notable negative impact, with 27% of students expressing concerns about unrealistic ideals portrayed in Hallyu content.

On the positive side, Hallyu has various impacts that contribute positively to high school students' lives:

- Self-discovery is fostered by Hallyu, with 19% of students experiencing personal growth and self-discovery through engagement with Hallyu.
- Creative inspiration is a positive outcome, with 26% of respondents finding motivation and ideas for creative pursuits through Hallyu content.
- A boost in confidence is reported by 33% of students, indicating that Hallyu contributes positively to their self-esteem and self-confidence.
- Inspirational role models are found in Hallyu, with 22% of students identifying positive figures in Korean entertainment that serve as role models.

DISCUSSION

The substantial influence of Hallyu on media consumption habits, with 24% of respondents indicating its impact underscores the pervasive role of Korean entertainment in shaping students' recreational choices. Social media engagement (16%) aligns with this trend, indicating that Hallyu serves as a significant conversation starter and community-building force. This suggests an opportunity for schools to integrate relevant content into media literacy programs, fostering critical thinking about the media students consume. Fashion and lifestyle (19%) being influenced by Hallyu demonstrates its impact on personal expression and cultural preferences. Educators can leverage this interest to create culturally diverse activities within schools, fostering an inclusive environment that reflects students' diverse tastes and interests. However, the lower impact of language learning (8%) suggests that while Hallyu may contribute to language exposure, it's not a predominant motivator. Schools can explore more interactive and engaging language learning methods, incorporating elements from Hallyu to make the learning experience more appealing.

The high visual appeal (27%) and idol fandom culture (24%) highlight the significance of aesthetics and personal connection with celebrities. This finding suggests an opportunity for schools to incorporate visually engaging content in teaching materials and encourage positive fandom behaviors. Youth-centric themes (19%) being a factor of attraction aligns well with the high school demographic. Schools can explore ways to integrate themes from Hallyu that resonate with students' experiences, making lessons more relatable and engaging.

The COVID-19 pandemic, coupled with the increased reliance on digital platforms for education and entertainment, has exacerbated students' engagement with Korean entertainment. As most students had more free time due to school closures, there was a marked increase in screen time and consumption of Hallyu



content, leading to both positive and negative consequences. Studies suggest that online interactions during the pandemic have contributed to stronger connections within global fandoms but also heightened social isolation for some students (Bhattacharya, 2021). With the extended periods of lockdown, many students turned to digital platforms as their primary source of social interaction and entertainment, resulting in an intensified engagement with K-pop and K-dramas. However, the increased reliance on these platforms also led to concerns about excessive screen time, which impacted students' academic performance and physical health. The pandemic, therefore, acted as both a catalyst for increased Hallyu consumption and a challenge in terms of maintaining a balanced lifestyle. The concern about excessive screen time (27%) is the highest negative impact reported, indicating a need for awareness and guidelines on responsible screen use. Schools can play a pivotal role in promoting healthy screen time habits, emphasizing the importance of balancing entertainment with academics and physical activities. The significant percentage (40%) expressing concerns about unrealistic expectations suggests that media literacy programs should address the portrayal of beauty standards and success in Hallyu content. Schools can engage students in discussions about self-esteem, body image, and setting realistic goals.

The positive impact on creative inspiration (26%) opens avenues for incorporating Hallyu-inspired projects in the curriculum, encouraging the students to express themselves creatively. Schools can explore collaborations with art and cultural programs to harness this creative energy. Boost in confidence (33%) and self-discovery (19%) as positive impacts underscore the potential for Hallyu to contribute positively to students' psycho-social well-being. Educators and parents can encourage students to explore their identities through various interests inspired by Hallyu. Inspirational role models (22%) suggest that Hallyu offers students positive figures to look up to. Schools can acknowledge and celebrate diverse role models, fostering a sense of pride and inspiration among students.

The influence of Hallyu on adolescent development is complex. The adolescent stage, as described by Erikson (1968), is a critical period of identity formation. Adolescents actively seek ways to define themselves, and Hallyu offers them diverse cultural models through K-pop idols and K-drama characters. Students' immersion in these cultural forms provides them with tools for exploring their identity, particularly in the areas of appearance, interpersonal relationships, and personal aspirations. These content forms allow them to navigate the challenges of adolescence, such as the development of social roles and personal values.

However, exposure to idealized portrayals of success, beauty, and romance in K-pop and K-dramas can lead to social comparison (Festinger, 1954), which may result in dissatisfaction or unrealistic expectations. The flawless beauty standards, the depiction of extravagant lifestyles, and the romanticized notions of success in K-dramas can create pressure among adolescents to conform to these ideals, leading to potential issues with self-esteem and body image. As adolescents are particularly sensitive to external validation during this period of development, they may feel disillusioned when their real lives do not align with the fantasy worlds portrayed in Hallyu content.

The presence of strong role models within K-pop fandoms has a dual impact on students. On the one hand, these role models inspire confidence and personal growth, promoting messages of resilience and self-love. On the other hand, the idolization of these figures can sometimes encourage unrealistic comparisons, where students internalize the perfection of their idols and attempt to emulate them to an unhealthy extent. Thus, while Hallyu offers many positive opportunities for self-expression and empowerment, it is essential to recognize and address the potential negative effects it can have on adolescent self-concept and psychological well-being.

These findings emphasize the need for a balanced approach to integrating Hallyu into high school environments. While celebrating its positive impacts addressing concerns such as excessive screen time and



unrealistic expectations is crucial. Media literacy programs should be an integral part of the educational curriculum, equipping students with the skills to critically analyze and navigate Hallyu content.

Moreover, schools can capitalize on the cultural diversity introduced by Hallyu to create inclusive environments. Integrating elements from Hallyu into various subjects from language classes to art projects, can make the educational experience more engaging and relevant for students.

Educators, parents, and policymakers should collaborate to establish guidelines for responsible screen use, recognizing the potential negative impacts on academic performance and mental well-being. Conversations about body image, self-esteem, and goal setting should be woven into the broader discourse of media literacy.

In conclusion, the impact of Hallyu on high school students is a complex interplay of positive influences and challenges. Understanding these nuances is vital for creating educational environments that can cater to students' interests but also equip them with skills to navigate the digital landscape responsibly. As Hallyu continues to shape global pop culture, its role in education demands thoughtful consideration and proactive measures to ensure a positive and enriching experience for high school students.

Limitations:

The major limitations of this study are as follows:

1. Small sample size: The limited number of participants may not be representative of the diverse experiences and opinions of all high school students.
2. Self-reporting and social desirability bias: The responses collected through Google Forms rely on self-reporting which may be subject to social desirability bias. Participants might provide responses they perceive as favorable or socially acceptable rather than expressing their true opinions.

CONCLUSION

The research underscores the profound influence of Hallyu on high school students, shaping their media consumption, recreational choices, and socio-cultural preferences. The findings emphasize the need for a nuanced and balanced approach to integrating Hallyu into educational environments. While celebrating its positive impacts on creativity, confidence, and cultural diversity, addressing concerns such as excessive screen time and unrealistic expectations is crucial. The research advocates for the integration of media literacy programs into the curriculum to equip students with critical analysis skills. Collaborative efforts among educators, parents, and policymakers are essential to establish guidelines for responsible screen use, ensuring a positive and enriching experience for students in the evolving landscape of global pop culture.



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FOSTERING GEOGRAPHIC LITERACY: THE IMPERATIVE FOR INTEGRATING GEOSPATIAL TECHNIQUES IN HIGH SCHOOL CURRICULUM

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Abstract

The study explores the effects of including geospatial techniques in the high school curricula to enhance geographic literacy among students across all boards in West Bengal, India. The prominent gap in the practical implementation of geographic education has been recognized, thus, this research lays emphasis on the importance of hands-on geospatial training to equip students with sufficient skills for pursuing higher studies in this academic field and further pursue career opportunities in arenas of geospatial technologies. The research design integrates both qualitative and quantitative methods, which includes a survey of 51 students, research scholars and educators across various school boards, along with a thorough review of literature on the inclusion of geospatial technologies in education across the globe. The data was analysed using the SPSS software to understand the interrelations between educational outcomes and exposure to practical geographic knowledge. The results reveal that students with practical knowledge of geospatial technologies display enhanced academic achievements and are more prepared for further endeavours in the academic field of geospatial technologies. Additionally, this study discusses recent government policies like the 'National Task Force on Geospatial Education', which emphasizes the integration of geospatial technologies in schools to refine the curriculum. This study culminates with the need for reforms in the curriculum framework backed by Government policies which will ensure that students can adapt to the requirements of the contemporary world by being equipped with relevant skills in geospatial technologies.

Keywords: *Geospatial Technologies, Geographic Literacy, Hands-On Geospatial Training, Academic Achievement, Curriculum Reform*

INTRODUCTION

In the dynamic landscape of education, the integration of geospatial techniques into high school curricula is increasingly imperative, fostering holistic development in the acquisition of geographical knowledge. Within the geographically diverse canvas of India, these geospatial techniques stand as crucial tools, aiding in environmental management, urban planning, and the formulation of informed decisions. To encourage more students to immerse themselves in geospatial techniques, they must become familiar with these methodologies, contributing to the growing community of individuals well-versed in geospatial techniques and analysis.

Geospatial technologies as a term can be utilized to elucidate on the spectrum of modern tools that help in the geographic mapping and study of the Earth and anthropological societies. Following the Second World War and the Cold War, new dimensions were introduced into the sphere of mapping where the mastery of photography imagery depended on satellites and computers. Satellites that circle our planet in outer space are



able to capture images of the Earth's surface and anthropological activities which assist in the refined understanding of land use and land cover of our world. Simultaneously, computers allowed for the storage of these images along with the development of certain digital software that would lead to providing assistance in interpreting such satellite images.

Different geospatial technologies include Remote Sensing, Geographic Information System (GIS), Global Positioning System (GPS), and Internet Mapping Technologies. These technologies provide images captured with the help of airborne cameras and sensors, identify geographic patterns, determine coordinate locations for human and military use, and are used as user interfaces where geospatial information is available to a wider audience.

The school's Geography curriculum at the higher secondary level does include brief information about GIS, however, students must receive hands-on experience in the practical aspect of the subject. Due to the solitary convey of theoretical knowledge at the intermediate levels of school, students are often unable to comprehend the entirety of the field. As a result, students are inept when trying to frame a holistic understanding of Geography as a discipline and often do not take geospatial techniques under consideration while pondering over which specializations they can opt for.

Several scholars have conducted both primary and secondary studies that assess the need for integrating the practical use of these geospatial techniques in the high school curriculum. The conclusions drawn from these studies have mostly stated that educating students and imparting holistic knowledge including practical work, helps them to make informed decisions while making choices for their higher education. It has also been found that a higher number of students get enrolled in GIS-oriented programs if they have prior knowledge of the field, both theoretical and practical. Having systematic material about the intricacies of this branch of Geography can be achieved only if a continuum is maintained from the higher secondary standard instead of from the undergraduate level.

Geospatial technologies have been incorporated into the school curriculum in three different phases which have been implemented in schools in North America, Britain, Asia, Africa, and Latin America (Kholoshyn et. al., 2021). India, too, has incorporated these techniques into its curriculum for school students, but practical, hands-on training has not been provided to the students. This lack has led to a fundamental weakening of the basic foundation of knowledge in the case of those students who aspire to continue higher education in the same field.

This study aims to analyze further the extent to which the integration of geospatial technologies at the 10+2 level benefits students. Including hands-on experience in a Geography lab undeniably ensures the initiation of a holistic pedagogical approach, nurturing students toward a profound understanding of the subject matter. This continuum in sharing geospatial information will facilitate the smooth transition of students from high school to undergraduate, postgraduate, and beyond.

NEED OF THE STUDY

The main purpose of this study is to evaluate the pressing need for incorporating the study of geospatial techniques in the high school curriculum across all boards. The presumption that there is an acute dearth in practical education is explored in the study that will eventually help to formulate recommendations leading to the holistic development of each child to fully equip them for future students and career prospects.



This study puts forth a vital lacking in the practical application of the discipline of Geography among high school students. During the higher secondary level of education, students acquire enough theoretical knowledge but not enough practical knowledge. Urban planning, environmental management, among others are developing fields requiring the use of such geospatial technologies. Thus, this paper highlights the perception of students and their academic achievements resulting from the practical experience gathered during their higher secondary stages.

Apart from better academic achievements and subsequent career options, this study also sheds light on how including geospatial techniques leads to superior geographic understanding that is not only confined to theoretical knowledge but explores the realms of practical, hands-on experiences as well.

OBJECTIVES

The **objectives** of this study include:

1. To determine the urgent imperative for integrating geospatial techniques into the high school curriculum.
2. To ascertain whether an in-depth understanding of these technologies influences students to pursue a career in this field.
3. To assess the difficulties and feasibility of implementing geospatial techniques in Indian high schools' geography curricula.

REVIEW OF LITERATURE

Geographic Information System (GIS), has garnered substantial attention for their capabilities in enhancing the facilitation of education, particularly in K-12 settings, although their implementation is presently limited. Humble (2023) emphasizes GIS as a very significant medium for facilitating knowledge in the future where it can be integrated on a vast level into the daily lives through GPS and other tracking technologies. The quality of research and type of research on GIS's education and integration in the curriculum is still emerging and is a field where a number of possibilities are awaiting. The different chances or opportunities include that GIS is easily accessible, its ability for transdisciplinary learning, and its utilization beyond the four walls of the classroom. On the other hand, there are certain limitations involving the requirement for training where teachers can be specialized in the skill of using the GIS tools, and infrastructural support from the end of the institution. A conceptual model was projected to make sure that the utilization of GIS is set on the same track with the educational objectives, offering insights for research to be conducted in the future and applications that can improve GIS integration in K-12 classrooms.

Siljeg et. al., (2022) conducted a study including 30 secondary schools in Croatia analyzing the perceptions of about 611 students and 96 teachers with respect to the integration of GIS into the curriculum. Both the sample groups had displayed positive perceptions towards this integration while more than 80% of the teaching faculty addressed the fact that there is insufficient representation of GIS in the present curricula. They also emphasized on certain obstacles such as lack of access to proper software, insufficient training, and low curricular inclusion as issues leading to inefficient integration or lack thereof. A significant result of the study exposed 77% of teachers revealing that they do not use GIS in their teaching methodology. However, although these challenges exist, both the teachers and the students addressed the fact that there is a dire need for the implementation of GIS and also emphasized the imperative for stronger institutional support where the infrastructure is strengthened in order to support this integration. The findings of this study align with the evolving global trends where the integration of geographic information system faces the similar kind of obstacles yet they offer significant benefits to one's pedagogy.



Peterson et al., (2020), in their paper titled 'High School Students' Experiences with Geographic Information Systems and Factors Predicting Enrollment in the Geospatial Semester' find that students are more likely to enroll in GIS courses at the undergraduate level if they possess prior knowledge and awareness of the subject, coupled with hands-on experience using GIS technologies in the classroom. The research paper extensively elaborates on how students exposed to GIS education are more inclined to specialize in the field during higher education. In addition to the theoretical knowledge imparted in a Geography class, practical work plays a pivotal role in instilling ideas, enabling students to make informed decisions about their professional choices.

McCloughlin (2015) in his paper titled 'The Role of Global Positioning Systems in Education: science, mathematics, geography, and history – a tool for integration' highlights the initiatives undertaken to implement GIS in primary and secondary education, however, the implementation of the same has been extremely sluggish. The incorporation of GIS into secondary education provides a new dimension to school subjects as a more quantitative approach can be learned by the students. Alas, schools at the K-12 level have been unable to implement such innovations to the maximum of their capabilities.

Kumar et al., (2014), in their paper titled 'Capacity Building through Geospatial Education in Planning and School Curricula' states that in the context of India, a nation characterized by diverse topographical features, a variety of climate zones, and rich physical and cultural landscapes, the integration of geospatial technologies into high school curricula empowers students to explore and understand the countless continuous processes unfolding each day. Developing a profound comprehension of RS-GIS technologies requires a continuum of education starting from the high school level, allowing students to seamlessly grasp concepts and practical applications as they progress to undergraduate and postgraduate levels. Recognizing the significance of this, the Indian Institute of Remote Sensing (IIRS) has initiated efforts to enhance understanding regarding space and geospatial techniques among young students at the 10+2 level.

Pandey (2012), in her paper titled 'GIS in Indian school curriculum' underscores the deficiency in the inclusion of geospatial techniques in high school curricula, resulting in students lacking a comprehensive understanding of the subject matter. The author further notes that while GIS techniques are introduced in the final year of undergraduate studies in India, students often struggle due to a lack of a solid foundation from their high school level. Geospatial techniques, which encompass Remote Sensing and GIS, provide a framework for the visualization, analysis, and interpretation of spatial data. Integrating these techniques into high school education enables students to develop skills in interpreting satellite images, paving the way for diverse opportunities and specialization in their professional domains. The practical application of mapping various distributions through these technologies provides students with hands-on experiences, offering them valuable insights into the realm of geospatial techniques.

Tiwari et al., (2011), in their paper titled 'India: Localized Introduction of GIS in Elite Urban Private Schools and Prospects for Diffusion' discusses the importance of integrating GIS into the secondary school curricula. It has been unearthed that although GIS has been incorporated into the school syllabi, it is still in its infancy. The growing demand for GIS-based technologies and individuals who can administer the same is all the more reason behind the amalgamation of GIS into the core curriculum at both public and private schools associated with the national boards. This study, although acknowledges the incorporation of geospatial technology at the high school level, also highlights the discontented inclusion of the sub-branch into the discipline.

Goldstein (2010), in her paper titled 'Integration of Geospatial Technologies into K-12 Curriculum: An Investigation of Teacher and Student Perceptions and Student Academic Achievement' stated that students believed their intellect was magnified upon the addition of geospatial technologies in their school curriculum.



This study conducted quantitative research which was quasi-experimental in its basic design. The inclusion of GIS-based technologies has been proven to be more effective in the academic journey of the majority of students.

Several studies have been conducted on the aforementioned topic which explore various aspects of the inclusion of geospatial techniques in school curricula. The imperative for integrating essentially GIS-related practical tasks in the higher secondary levels of school will support students to develop a panoramic idea of the discipline that will help them make informed decisions while they advance towards acquiring higher education. Sundry scholars have qualitatively and quantitatively approached this study due to the compelling need of the hour, which is to comprehend the extent to which having a robust base in the ground of geospatial techniques will benefit the students from the school level to further themselves in their respective lives.

METHOD

To precisely analyze the imperative for integrating geospatial techniques in school curricula, both quantitative and qualitative approaches have been utilized to fulfill the aforementioned objectives by making use of primary and secondary data. During the initial stages of this research, existing literature on this subject had been reviewed extensively. Following the collection of secondary data, a questionnaire was prepared that was circulated among the respondents through Google Forms and some interviews were carried out over phone calls and video calls as well.

The primary data had been collected using Random Sampling, following which the SPSS software had been used to establish correlations between different components. Finally, from the data collected, conclusions and inferences have been made. In the primary survey conducted, the sample size was 51, where said number of respondents were interviewed to gather their perspectives for the holistic completion of this study. Responses from individuals hailing from West Bengal were gathered who had studied in different boards recognised nationally. The entirety of the data collected has ultimately supported the conclusions drawn with respect to the objectives that had been set initially.



RESULTS AND DISCUSSION

I. SAMPLE PROFILE:

Table 1: Sample Profile of Respondents

AGE				
Age Group	Less than 22 years	22 to 26 years	26 to 30 years	More than 30 years
Percentage of Respondents	4%	80%	12%	4%
OCCUPATION				
Occupation	School Educator	Research Scholar	Private Sector Employee	Student
Percentage of Respondents	5.88%	11.76%	19.60%	62.74%
HIGH SCHOOL BOARD				
Name of Board	West Bengal Council of Higher Secondary Education (WBCHSE)		Council for the Indian School Certificate Examinations (CISCE)	Central Board of Secondary Education (CBSE)
Percentage of Respondents	47.05%		33.33%	19.60%
SCHOOL STREAM IN HIGHER SECONDARY LEVEL				
Stream	Humanities		Science	Commerce
Percentage of Respondents	76.47%		23.52%	0%
TOTAL RESPONDENTS	51			

Source: Primary Survey, December 2023



II. MAIN FINDINGS:

1. Variable Correlations Analysis:

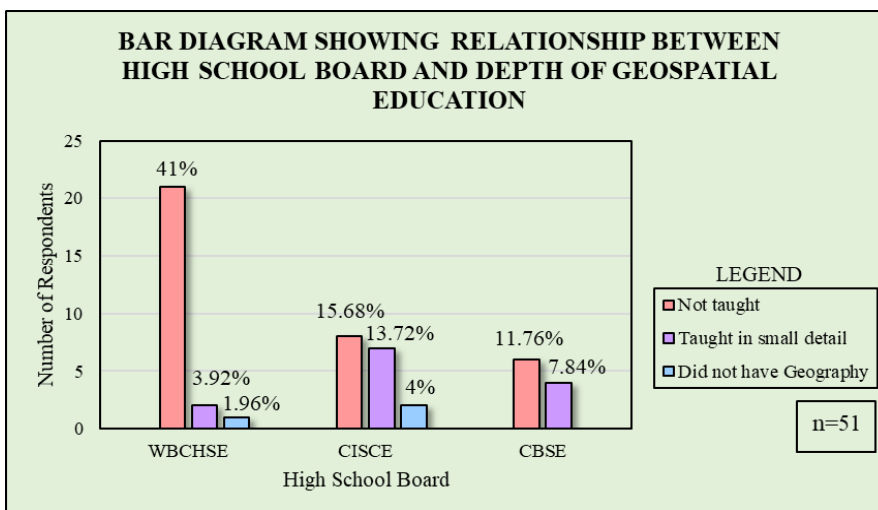
A. School Board Impact on Depth of High School Geospatial Education

CROSS-TABULATION BETWEEN SCHOOL BOARD AND DEPTH OF EDUCATION					
	Depth of Geospatial Education				Total Number of Respondents
Higher Secondary School Board		Not a part of the curriculum	Taught in small detail	Did not have Geography in H.S.	
	WBCHSE	21	2	1	24
	CISCE (ISC)	8	7	2	17
	CBSE	6	4	0	10

Source: Primary Survey, December 2023 [n=51]

A cross-tabulation has been performed to display the relationship between the school boards of the respondents at their high school level and the depth of GIS-based information that was imparted to them during the said high school years. A correlation analysis has been performed where the correlation value is calculated to be $r = 0.224$ indicating that there is a very low but positive relationship between the high school board and the depth of GIS-based knowledge. This implies that certain boards, taking into consideration both state and national boards, have included small sections of geoinformatics in their high school Geography syllabus whereas certain boards have not done the same. Albeit the part of the syllabus included in said boards is constricted only to the theory portions, however, students are at least aware of this field as against students from the other boards who never are made to learn about Geoinformatics in high school.

FIGURE 1: BAR DIAGRAM SHOWING RELATIONSHIP BETWEEN HIGH SCHOOL BOARD AND DEPTH OF GEOSPATIAL EDUCATION



Source: Primary Survey, December 2023

From this diagram, it can be inferred that in the case of the West Bengal State Board (WBCHSE), Geoinformatics had not been taught at all for almost 41% of the respondents who belong to the aforementioned board. 3.92% had said that they were taught about geoinformatics in small details as a part of their high school syllabus, whereas 1.96% of the respondents had said that they did not have Geography in their high school. In the case of CISCE (ISC) board, 15.68% of the respondents had said that they were not taught about geoinformatics, 13.72% had said that they did have geoinformatics as a part of their high school syllabus but they



were taught in very tiny details about the field only in theory, there was no inclusion of any kind of practical work. Finally, 11.76% of the respondents belonging to the CBSE board had said that they did not have GIS in their +2 level while 7.84% of the respondents stated that they were taught only in small theoretical portions.

B. GIS Employment vs. Higher Education Timeline:

CROSS-TABULATION BETWEEN EMPLOYMENT AND HIGHER EDUCATION				
Whether employed in a Geospatial Technology firm	The decision to pursue higher studies in the field and its timeline			Total Number of Respondents
		For post-graduation, after graduation	Not applicable	
	Yes	8	0	0
	No	0	43	43

Source: Primary Survey, December 2023

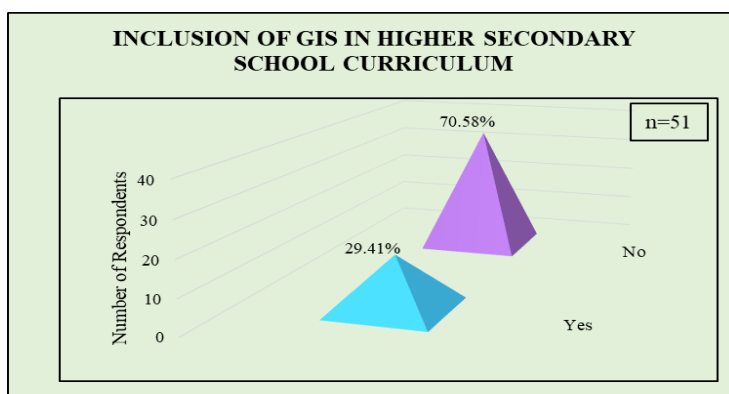
[n=51]

Another cross-tabulation was performed between the field of employment of the respondents and the timeline of when they had decided to take up Geoinformatics for their academic and henceforth, employment pursuits. A perfectly positive correlation value ($r=1$) is obtained from this relationship because all of the respondents who are currently working in Geoinformatics-based firms had all taken up Remote Sensing-Geoinformatics for their post-graduation after the completion of their graduation courses. According to the respondents, they did not have ample information, in few cases, barely any, to have the confidence to undertake the course of Geoinformatics directly after the completion of their high school board examinations. It was only after studying this field in great detail during the undergraduate Geography course that they were able to pursue this subject matter for their post-graduation, and then finally work in a GIS-based company.

2. High School Curriculum and GIS Integration:

A. Inclusion of GIS in the syllabus studied by the respondents:

FIGURE 2: BAR DIAGRAM SHOWING INCLUSION OF GIS IN HIGHER SECONDARY CURRICULUM

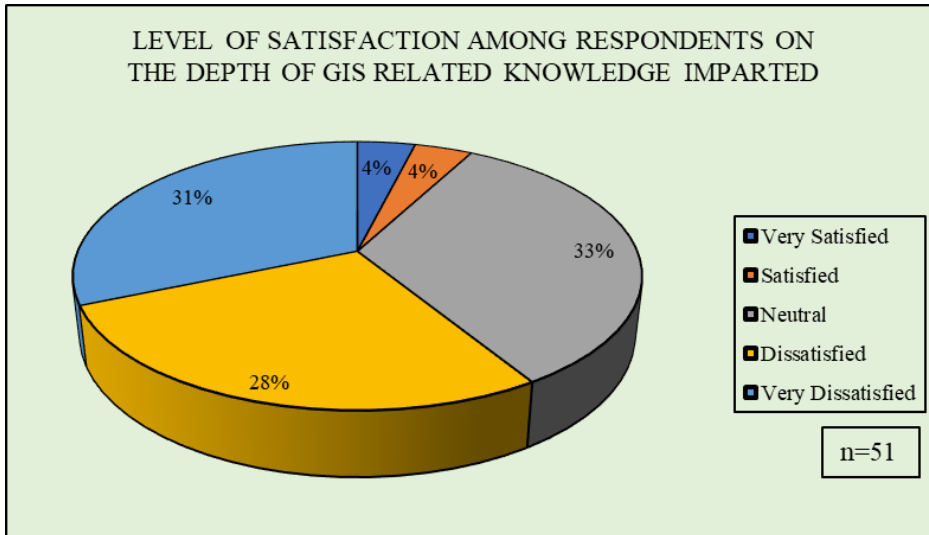


27.45% of the respondents had stated that they had studied theoretical concepts of geospatial technologies, but they had also mentioned that they had received no hands-on practical experience that would have helped them to perceive the geospatial concepts in a better fashion. Unfortunately, 70.58% of the respondents mentioned that they had received no education on geospatial technologies during their high school years as a part of their geography syllabus at all.

B. Satisfaction Levels of Respondents based on the depth of GIS-based education received from +2 level

Source: Primary Survey, December 2023

FIGURE 3: PIE CHART SHOWING SATISFACTION LEVELS AMONG RESPONDENTS ON THE DEPTH OF GIS-RELATED KNOWLEDGE IMPARTED



Source: Primary Survey, December 2023

depth of education received. On the other hand, 4% of the respondents said that they were satisfied while another 4% of the respondents said that they were extremely satisfied with the depth of the information received by them. This was majorly because they believe geospatial technologies should only be taught in small amounts to the students of the high school level, as it may be difficult for them to comprehend and understand the practical portions well.

3. Respondents' Perception of Integration of Geospatial Technologies

All the respondents unanimously agreed on how geospatial technology-based education should be included in moderate amounts because it will eventually assist in the development of the student's holistic development in the discipline of Geography. Some respondents had mentioned that since GIS is an extremely innovative field that is now slowly and steadily becoming a part of several agencies that assist in the functioning of regular lives, it is essential and imperative for the students to be aware of these concepts, both In theory and practical. High school students should know how to operate basic software applications, eg: QGIS, to at least have the minimum idea of how these applications work in practice. On the other hand, few respondents had mentioned that although GIS should be included in the high school curriculum, it should be made simple and should be included in small amounts so that the students are not intimidated by the high standards of this field.

Considering that only 27.4% of the respondents had studied concepts encompassing geospatial technologies, it was found out upon interviewing them that 45% of the same respondents would have, at some point in their academic career, taken up a course in geospatial techniques or would have committed their specialization to this field altogether. They had remarked how the lack of proper theoretical and practical training had prevented them from developing the skills required to specialize in it during their high school years which, in fact, had delayed their process of diving into this field, sooner or later. On the other hand, 55% of the respondents stated that although Geospatial techniques are an essential section in modern technologies that helps one to navigate through complex, structured technologies, the said field never sparked an interest in them to pursue it academically.



5.88% of school educators were also interviewed in order to analyze the necessity for integrating geoinformatics into the high school Geography syllabus. All three educators shared their opinion when they stated that it is necessary for a better representation of the concept of Remote Sensing and Geographic Information Systems as it will help students grasp the concepts in a more refined manner that will later provide aid when it comes to these students choosing their future prospects.

While in conversation with the respondents, some of them did mention how GIS was comparatively a difficult area for students to well-verse themselves with directly during their high school years. According to them, the complex procedures made use of during the practical work may not be as easy for students to understand in school, as many do not have developed and proper skills to operate the computer itself. Another issue of implementing GIS in high school, as mentioned by some respondents was that many schools, in our state, do not have proper infrastructural facilities to conduct practical classes as a part of the geography syllabus which might result in the students losing out on marks during final and/or board examinations due to their incapability of performing the directed procedures due to lack of access and practice.

CONCLUSION

According to the responses recorded from the 51 respondents, it can be stated that there is an urgent need for the integration of geospatial technologies in the high school geography syllabus, across all boards. Development of these skills among students from a young age will not only enhance their cognition but will also prepare them for undertaking this course for their higher studies. Clearance of basic concepts along with basic computer laboratory work will gear them up, boosting their confidence into believing that they also have prospects in technological fields. However, it should be also kept in mind how the students may not have the capacity to understand all concepts as it may be difficult for them to comprehend it all. Hence, a proper balance should be figured out that will help the students develop these skills and will also be with their understanding capabilities.

An in-depth understanding of this field has influenced them to undertake this course. Since Geospatial technologies are taught as a part of the undergraduate geography syllabus, students are able to understand their potential in this field and take it up for their post-graduation. However, it had also been mentioned by a couple of respondents that if they were taught about these geospatial techniques as a part of their high school syllabus, they might have taken up this course directly after school for their graduation and not waited another three years to study this field in great detail. A couple of the respondents also mentioned how they had decided to specialize in this field after having completed their first post-graduation degree. Hence, it can be established how in-depth understanding and comprehension of a subject might influence students to take up said course earlier.

There are advantages and disadvantages to using geospatial methods in India's high school geography curriculum. Positively, incorporating geospatial technology can improve students' spatial reasoning abilities and create a more dynamic and engaging learning environment. Examples of these technologies include Geographic Information Systems (GIS) and Remote Sensing. They can investigate practical problems, examine geographical patterns, and arrive at wise conclusions thanks to it. However, there are issues with access to technology, teacher preparation, and infrastructure. Many schools may lack the tools and technological know-how needed to integrate geospatial tools into the curriculum in an efficient manner. Additionally, it could be necessary to modify the curriculum to make room for this modern technology. This would necessitate a substantial amount of work in the fields of curriculum creation and teacher preparation. The Ministry of Human Resource Development released a report in 2013 named 'National Task Force on Geospatial Education' recommended four different projects to integrate geospatial technologies into the



general educational curriculum of the entire nation to equip the Indian population to participate in the dynamic industry making use of these geospatial techniques. One of the four projects, namely, the School Geospatial Education Project (SGEP) focused upon the national incorporation of the study of geospatial technologies into the middle and high school curricula respectively. CBSE and NCERT were given the responsibility to carry forward the recommendations of the task force.

Along with recommendations centering upgradation of the school syllabi, the report also laid emphasis on proper teacher training to enable the smooth transfer of knowledge from the teacher to the students in case of such a technical subject at young and tender ages. However, enough practical exercises have not been implemented in the curriculum which has led to a gap in the implementation of this report. Besides, data collected from the primary survey represents the information that schools have autonomy over whether they will teach chapters on Remote Sensing and GIS to the students, and more often than not, it was found that schools avoid exploring these chapters in the classroom.

Certain recommendations for the successful implementation of incorporating geospatial techniques in the high school curriculum are:

1. A comprehensive plan must be devised for the successful integration and implementation of geospatial techniques in the high school curricula.
2. Robust teacher training programs must be conducted for teachers to have essential skills and knowledge to effectively teach school students.
3. investments must be made to improve the infrastructural facilities of schools to ensure smooth and thorough practical training in computer laboratories.
4. Awareness must be spread among students and parents about career opportunities in this field of study so that they do not shy away from this discipline due to its technical nature.
5. Regular upgradation of the curriculum is required so that students can keep up with the dynamic requirements of the world.

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PARTITION THROUGH THE LENS OF LITERATURE AND POPULAR CULTURE, AS WELL AS ITS LONG-TERM IMPACT ON THE CURRENT GENERATION

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Abstract

This paper aims to assess the partition of India not only as a historical phenomenon but also its long-term effect on the lives of the people who lived through it. The attempt is to understand the impact of the trauma generated in the minds of the sufferers because of the atrocities committed during that time. The paper also tries to analyze the aftermath of the event and how it continues to exert its influence on the following generations. This is intended to be done by examining accounts, novels, and short stories written, as well as movies made on the theme of partition. Some of the authors whose works are to be included are Khushwant Singh (Train to Pakistan), Amitav Ghosh (Shadow Lines), Saadat Hasan Manto (Toba Tek Singh, Khol Do), Bapsi Sidhwa (Ice Candy Man), Geetanjali Shree (Tomb of Sand), et al.

Keywords: Trauma, Partition, Theme, Atrocities

INTRODUCTION

"At the stroke of the midnight hour, when the world sleeps, India will awake to life and freedom. A moment comes, but rarely in history, when we step out from the old to the new, when an age ends, and when the soul of a nation, long suppressed, finds utterance." Pandit Jawaharlal Nehru, the first Prime Minister of our sovereign nation, remarked on the afore-mentioned statement on the eve of Indian independence. Behind the curtain of pomp and pride of the birth of the largest democratic nation lies one of the bloodiest episodes humankind has ever witnessed: the Partition. A civilization that was more than 5000 years old was decisively torn into two separate nations, namely India and Pakistan. Further, Pakistan was peculiarly comprised of two states that were neither geographically nor culturally attached to each other: West Pakistan and East Pakistan (present-day Bangladesh). The only point of similarity between the two was their religious majority; Pakistan had a Muslim majority, while Indians were supposed to be predominantly Hindu. What resulted was perhaps the largest forced migration in history. Between 1946 and 1948, over 20 million people were displaced, 1 million were killed, and several others went missing. The religious communities, which had coexisted for more than a thousand years on the subcontinent, were suddenly boiling with hatred against each other. Their twisted idea of religious zeal led them to perform heinous acts, including kidnappings, murder, rape, and mutilation. Even after the atrocities had stopped, the generational trauma continued to stay with the people who survived. Several poems, stories, novels, songs, and movies continue to tell the story of the pain, suffering, and acute identity crisis that these people experienced, sometimes better than history itself. The aim of this paper is to analyze a handful of them and try to appreciate their contribution to the saga of partition.



Borders and belongingness in “Toba Tek Singh”

The boundaries between the countries, known popularly as the Radcliffe Line, were crafted in a mere five weeks by the British authorities under the supervision of Sir Cyril Radcliffe. It is important to note that these people had little knowledge about the Indian terrain or culture. Consequentially, there was a severe identity crisis among the people displaced, who could not understand to which place they actually belonged. Saadat Hasan Manto's satirical short story “Toba Tek Singh” (1955) is set in a lunatic asylum in Pakistan a few years after the partition. The Sikh inmate, Bishan Singh, assumes that his village is somewhere called Toba Tek Singh. Being mentally deranged, he is oblivious to the fact that he belongs to India or Pakistan. As the Sikh and Hindu inmates are ordered to be transferred to India, Bishan Singh refuses to comply as someone tells him that Toba Tek Singh is in Pakistan. Chaos ensues at the time of exchange at the Wagha Border as Bishan Singh (also called Toba Tek Singh) is not ready to leave his homeland. The story ends with the following line: “There, behind the barbed wire, was Hindustan. Here, behind the same kind of barbed wire, was Pakistan. In between, on that piece of ground that had no name lay Toba Tek Singh.” Manto skillfully hides an undeniable truth behind the guise of Bishan Singh's illogical mutterings: that men and women weren't sure where their home was truly located.

The Screams Silenced: Predicament of Women during Partition as Reflected in ‘Khol Do’, ‘Pinjar’, and ‘The Other Side of Silence’

Women were certainly the worst victims of partition. Around 75,000 of them were kidnapped, raped, forcefully married, and even mutilated by the enraging militia without any moral scruples. The age-old idea of women as the ‘honor’ of families was imposed by patriarchy from time immemorial. This led men to kill their own daughters, wives, and sisters in order to save the ‘reputation’ of the family. Manto's short story ‘Khol Do’ (1948) is beyond shock rendering as they express the primal lust hidden in humankind and their monster-like instincts that view women as nothing but a piece of dead flesh. Young girls like Sakina didn't have the option to escape the clutches of the sexual predators, which consisted of men from all sections of society, from ruffians to doctors.

In her account ‘The Other Side of Silence’ (1998), Urvashi Butalia narrates the traumatic recollections of several victims, especially women. A close examination of these accounts brings forward two paradoxical narratives. On one hand, the nation is honored in the form of ‘Divine Mother’, and on the other, there lies the silence that women have carried within them for ages. Sexual violence has been considered taboo since time immemorial, and hence women have restrained themselves from revealing it to anyone for fear of humiliation and ostracization. Butalia brings forward the story of Harbhajan Kaur, who was abducted and then forcibly married by Afzal Khan. She is renamed Shehnaj, and with him, she bears five children. Later, when Harbhajan is reunited with her parents, they refuse to part with her. She is remarried to a Sikh man, and Afzal has to return to Pakistan with the children. After several years, her grandson from her second marriage comes across the story she had been hiding for years and her desire to meet her children in Pakistan.

Amrita Pritam, in her 1950 novel ‘Pinjar’ (translated as cage), narrates the incident of Puro, a girl from Lahore who suffers from a similar plight after being picked up by a man called Rashid. Later, when she flees Rashid's place, her family refuses to accept her as they think her purity is ‘contaminated’. Puro is left with no other option but to return to Rashid and accept him as her husband. Her plight compels us to reminisce about the sufferings of several such young women who were disowned by their own families as their ‘chastity’ was compromised. The pain of Puro and Shehnaj mirrors that of those innumerable women who were dislocated with their identities snatched from them.



Religious hatred and its psychological impact: Bapsi Sidhwa's 'Ice Candy Man' (1988)

In 'Ice Candy Man' (later published as 'Cracking India' in 1991), Bapsi Sidhwa narrates the story from the perspective of an eight-year-old paraplegic girl, Lenny. She belongs to a well-to-do Parsi family based in Lahore and spends most of her time with her *ayah* Shanta. Shanta is romantically admired by Dilnawaz, an ice cream seller, but his feelings are unreciprocated by her. Instead, Shanta is attracted to Hassan, whose calm demeanor foils the boisterous nature of Dilnawaz. The incidents take a tragic turn when Dilnawaz's sister is killed in the partition riots. This fills the mind of Dilnawaz with hatred against the Hindus. Hassan gets killed for overtly supporting the Hindus, and with the assistance of other fanatics, Dilnawaz forcefully takes away Shanta. An adult Lenny narrates that the fate of Shanta remained unclear as she never came across her *ayah* again in her life. The novel was later adopted by Deepa Mehta into an equally thought-provoking movie titled '1947 Earth' that was released in 1998 and featured Shabana Azmi, Nandita Das, and Amir Khan.

Brutality prevailed on both sides of the border, and torturing the weak was made the weapon of collective vengeance. Trauma and loss birthed malevolent intent in the minds of civilians like Dilnawaz, turning them into metaphorical beasts of prey, as the former calls himself at one point of the movie. Killings and destruction gave rise to even more of the same, and people were caught in their vicious circles. This reminds us of Khushwant Singh's 'Train to Pakistan' where Singh rightfully states, "The fact is, both sides killed. Both shot and stabbed and speared and clubbed. Both tortured. Both raped."

Life Subsequent to Partition: Ritwik Ghatak's Partition Trilogy

In the films of the film stalwart, Ghatak, the pain of partition is poignant among the protagonists, who are often refugees suffering from the loss of homeland and livelihood. His critically acclaimed film 'Meghe Dhaka Tara' ('Cloud-capped Star', 1960) is set in a refugee colony on the outskirts of Calcutta. The refugees, who were uprooted from their own land, profusely struggled to make ends meet in the foreign land. The film narrates the story of Nita (Supriya Devi), a young woman who is compelled to sacrifice her education, love, health, and eventually her life in order to financially sustain her family. Even her family gives up on her at the end, as she contracts tuberculosis. In the final scene, Nita throws herself in her brother's arms with a gut wrenching cry: "Brother, I want to live!" The protagonist's desperate appeal echoes the cries of numerous youths whose lives were wasted away in constant struggle and sacrifice as the country fell apart. Nita's struggle reveals another paradox of Partition; although Partition made women victims of extreme violence and oppression but the post-partition Indian society saw women becoming bread-winners for their family.

'Komal Gandhar' released in 1961 deals with the lamentations of the victims of partition, agonized with the memories of famine and riots. The two orphan protagonists perfectly portray the emotions of people who have lost their home and family. The final film of the trilogy is *Subarnarekha* ('The Golden Thread', 1962). It is one of the rare films from that era with a prominent Dalit character. In the film, although the refugees are struggling to survive, they don't refrain from practicing caste-based discrimination in their camps. The mother of a small Dalit boy, Abhiram, is carried off by the goons of the Zamindar, after which he is fostered by a Brahmin, Ishwar Chakravarty. As they grow up, the boy and Ishwar's younger sister, Sita (Madhabi Mukherjee), fall in love. When Ishwar objects to their relationship due to the boy's caste, they elope together. Ishwar Chakravarty, being a Brahmin, easily gets a job, while the Dalit Abhiram, despite having an honors degree, struggles to survive as a bus driver. The caste-based obsession bears a tragic outcome at the climax of the film. The bus Abhiram is driving accidentally kills a young girl, and the former is lynched to death. Sita, with no other option, has to resort to prostitution. In the movie, Ghatak artistically portrays the two worlds that existed side by side in the 1950s: "on the one hand, refugees suffering from acute poverty, and on the other hand, a nation



succumbing to modern decadence." The movie has a devastating ending, which again marks the theme of 'lost home' associated with the partition.

Longing for Lost Homes: Amitav Ghosh's 'The Shadow Lines' and Geetanjali Shree's 'Tomb of Sand'

Ghosh's second novel, 'The Shadow Lines', was published in 1988, and it has an anonymous narrator who grew up in post-Partition Calcutta. His grandmother, affectionately called Tha'mma, arrived in India as a refugee. Being a nationalist by heart, she rejects the idea of partition outright. Throughout the novel, boundaries are depicted as nothing but shadows, which have divided people carrying the same cultural and regional identities. Tha'mma is unable to understand that going to her childhood hometown of Dacca would now require a permit as it lies in a separate country. The novel focuses on the generational trauma that persists even in the narrator's cousin Ila, who belongs to the Indian diaspora. As an NRI, she suffers from the feeling of dislocation from her childhood. In an attempt to find an alternative identity, she weds Nick Price, a British. Later, the marriage turns out to be disastrous.

The novel is divided into two parts: 'Going Away' and 'Coming Home'. Nostalgia revolving around one's past and the constant dream of returning to one's homeland form the central essence of the novel. Tha'mma's longing for her hometown leads her to travel to Dacca in the context of bringing her aging uncle Shri Goshtobihari Bose back. Their journey drives the novel towards its devastating climax, where the narrator's uncle Tridib is killed in the 1964 Dacca riot. Tridib's horrifying nemesis reveals another hard truth to the readers. The communal frenzy and inter-religious hatred can be triggered anytime and can wreak havoc on life.

A theme of longing for one's lost home has also found its way in Geetanjali Shree's International Booker Prize-winning novel 'Tomb of Sand' (originally published as *Ret Samadhi* in Hindi, translated by Daisy Rockwell in 2018). The story follows an octogenarian mother, Chandraprabha Devi, referred to as *Ma* throughout the novel. The old woman, who had been in depression ever since her husband's death, attempted to find a new lease in life through her desire to travel to Pakistan. The crack on the wall into which she stares constantly in her state of despair becomes a symbol of the huge crevasse that created the hearts of the uprooted people as they pined to see their motherland. Like Tha'mma in *Shadow Lines*, the country's borders fail to convey any meaning to her, as her only desire is to unite with her childhood lover and her first husband, Anwar. Eventually Ma makes her way to Khyber-Pakhtunkhwa, searching for her ex-husband and, ostensibly, the part of herself hewn off by the border's enforcement. Shree's 'Tomb of Sand', through its success in making the readers confront the unhealed border wound, carries the legacy of the long lineage of partition literature.

Conclusion

It is impossible to deny the profoundness of the impact that partition has had on the lives of the people living on the subcontinent. The brutality Hindus, Muslims, and Sikhs unleashed on each other "destroyed our social sense, changed our political judgments, and destroyed our understanding of morality." Forced migrations still continue, creating a sense of anguish, anxiety, and deprivation. The stories of such people mostly remain unheard and unknown. Yet for the victims, forgetting them is unimaginable. History gives us information about major events and the statistics related to them. It is literature, films, and documentaries that unearth the hidden history that remains buried in time. Reading or watching them is like taking a journey inward that reveals an indubitable truth about the nature of human existence.



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IMPACT OF TEACHERS' WELL-BEING ON STUDENTS' LIFE

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Abstract

This paper assesses different dimensions of teachers' well-being, including physical, mental, emotional, and social aspects. High well-being is a state of happiness, fulfilment, and good physical health, where individuals feel positive emotions, have healthy relationships, and demonstrate strong resilience. Conversely, low well-being is a state where individuals experience stress, dissatisfaction, and poor health, often leading to negative emotions, disconnection, and difficulty navigating life. It explores how factors like workload, job satisfaction, work-life balance, and professional support influence the overall well-being of teachers. Moreover, this study investigates the intricate mechanisms through which teachers' well-being contributes to student achievement. It examines the pathways by which teachers' self-efficacy impacts teaching effectiveness and ultimately, the holistic development of students. The study further investigates how teachers with good mental health have better focus, patience, and work effectively in the classroom. They maintain work-life balance, and handle challenges with strong resilience. A positive and appreciative teacher enhances the learning environment, leading to better student engagement.

Keywords: Teacher Well-Being, Self-Efficacy, Effective Teaching, Holistic Development, Student Achievement.

INTRODUCTION

Teaching has always been thought to be a less demanding profession, but that has changed drastically in the last few decades. Teaching is becoming a more difficult profession all over the world. According to Smylie (1999), "These are tough times to be a teacher".

What is well-being?

Well-being refers to the overall state of an individual's health, happiness, and prosperity. It encompasses various dimensions, including physical health, mental health, social connections, economic stability and a sense of purpose and fulfilment. Well-being is subjective and can vary from person to person, but it generally reflects a positive and satisfactory state of one's life.

What Are the Negative Impacts of Low Well-being?

- **Poor Physical Health:** Individuals with low well-being may experience a decline in physical health. Stress, anxiety and depression, often associated with low well-being, can contribute to various health issues, such as cardiovascular problems, weakened immune system and chronic conditions.
- **Mental Health Challenges:** Low well-being is often linked to mental health issues, including depression, anxiety disorders and a general sense of discontent. These conditions can significantly impair one's ability to enjoy life, make decisions, and cope with daily challenges.



- **Social Isolation:** A lack of well-being may lead to social withdrawal and isolation. Individuals experiencing low well-being may struggle to maintain healthy relationships leading to feelings of loneliness and further exacerbating their emotional state.
- **Reduced productivity:** Low well-being can negatively impact work performance and productivity. Individuals may find it challenging to concentrate, make decisions and maintain motivation which can affect both personal and professional success.
- **Decreased Life Satisfaction:** People with low well-being may report lower levels of life satisfaction and fulfilment. This can create a cycle where the lack of satisfaction perpetuates negative feelings and attitudes, making it difficult to break free from the cycle.
- **Impact on Relationships:** Low well-being can strain relationships with family, friends and colleagues. Negative emotions and behaviours associated with low well-being may create conflicts and hinder the development of positive connections.
- **Mood Disorders:** Low well-being can cause mood disorders including agitation, restlessness, irritability, racing thoughts. This can also lead to lack of energy, insomnia or excessive sleeping, rapid speech or movement.

Why is Well-being Important?

- **Health and Longevity:** High levels of wellbeing are associated with better physical health and increased life expectancy. Individuals with a positive sense of well-being are more likely to engage in healthy behaviour leading to improved overall health.
- **Mental Health:** Well-being is closely linked to mental health. Positive well-being contributes to lower levels of stress, anxiety and depression. It enhances emotional resilience and coping mechanisms, enabling individuals to navigate life's challenges more effectively.
- **Quality of life:** Well-being is a significant determinant of an individual's overall quality of life. It encompasses satisfaction with one's life, a sense of purpose and the ability to experience joy and fulfilment in daily activities.
- **Productivity and performance:** Individuals with higher well-being tend to be more productive and perform better in various aspects of life, including work, education and personal relationships. Positive emotions and a sense of purpose can enhance motivation and focus.
- **Social relationships:** Well-being is linked to positive social interactions and relationships. Individuals with higher well-being often have better communication skills, stronger social connections, and more fulfilling relationships with family, friends and colleagues.
- **Creativity and Innovation:** Individuals who experience well-being are more likely to think creatively, problem-solve effectively, and generate new ideas.
- **Workplace Satisfaction:** Well-being is a key factor in job satisfaction and professional success. Employees with higher well-being tend to be more satisfied with their work, exhibit higher levels of commitment, and are more likely to contribute positively to the workplace.

Significance of the Research Paper

Teachers play a crucial role in shaping the educational experiences of students. Research suggests that a teacher's well-being can impact their effectiveness in the classroom. If teachers are stressed, burnt out or facing challenges in their personal lives, it may negatively influence their ability to teach effectively, which can in turn affect student's academic performance and engagement (Chaudhry & Chhajer, 2023). The well-being of teachers can influence the quality of relationships they establish with students. A positive and supportive teacher-student relationship is associated with better academic outcomes, improved behaviour, and overall



well-being for students. Understanding how a teacher's well-being affects these relationships can provide valuable insights into improving the overall learning environment.

Social and emotional learning of students also depend on the well-being of the teachers. Teachers with high well-being are likely to create a positive and nurturing classroom environment that fosters emotional well-being and social skills in students.

High levels of stress and burnout among the teachers can contribute to high turnover rates within the profession. Investigating the impact of well-being on job satisfaction and retention is important for understanding the factors that contribute to a stable and effective teaching work-force. Additionally, a positive teacher well-being can enhance the attractiveness of the teaching profession, promoting recruitment and retention of talented educators.

This paper can also help the policy-makers to identify strategies to support teacher well-being that can lead to the development of interventions and policies that enhance the overall educational experience for the teachers as well as the students.

The paper also helps us to understand the interconnectedness of teacher well-being and student outcomes, which promotes a holistic approach to education. It emphasises the importance of considering not only academic factors but also the well-being of educators in creating a conducive learning environment.

LITERATURE REVIEW

The present chapter provides a summary of the body of research conducted on the topic of impact of teacher well-being on Student's Life. The main objectives of reviewing literature related to the topic of research are:

- (a) Strengthening the foundation of the researcher's knowledge regarding the field of study.
- (b) Identification of gaps in current knowledge.

Studies on the prevalence of low well-being among teachers:

Wilss, Pillay, & Goddard (2005) in *Well-being, burnout and competence: Implications for teachers*, investigated burnout and competence in mid-career teachers in primary and secondary schools in Queensland. The study informs that 25% and 40% of beginning teachers in countries in the Western world and learning teaching or they are burned out. This research work engaged in a systematic review of other literatures, which show that early career teacher resignations are rising. The studies revealed that factors such as stress, burn-out, work overload and job satisfaction contribute to teacher attrition while factors such as administrative support, reasonable role expectations and decreased workplace stress contribute to teachers' intention to stay in teaching. The study also conducted a test with 41 male and 116 female teachers based in Queensland, to check their well-being. The teachers reported significantly lower burn-out levels on the MBI subscale scores. The teachers who were considering leaving their current job and the ones who perceived the effort they were putting into their work was greater than the rewards showed higher burn out levels on all three MBI scales. Consequently, their PCOISS score was also lower. Depersonalisation and self-rated competence indicate that while these teachers believe that they are competent at a 'satisfactory' or 'well' level, many are actually doing their job in a way that distances themselves from the people around, namely, their students and colleagues. Depersonalisation may arise as distancing mechanism that seeks to minimize the sense of incompetence that arises from the more difficult human interactions where the worker lacks sufficient skills to bring the interactions to a successful conclusion. This is consistent with the results published by Evers, Tomic, Brouwers



(2004). According to Smylie (1999), distancing and depersonalisation arises due to high expectations and job difficulties among teachers. Reducing teachers' feeling of isolation and increasing their self-esteem may alleviate this situation and foster well-being among teachers (Xin & MacMillan, 1999).

Studies on the factors that cause low well-being among teachers:

Nwoko, Emeto, Malau-Aduli & Malau-Aduli (2023) in A systematic review of the factors that influence teachers' occupational wellbeing examined the factors that cause low well-being among teachers through secondary data analysis. This systematic review of 38 studies explored and synthesized the perceptions of kindergarten to secondary school teachers about the factors that impact their occupational well-being. Low self-efficacy was found to be one of the factors affecting low well-being among the teachers. Stapelton, Garby, Sabot (2020) found out that teachers suffered from emotional exhaustion due to intense interactions with students, emotional intensity and dissatisfaction with the levels of support. Hence, organizational support and strategies were required for teachers, especially teachers with family care responsibilities. Job resources were also seen to be reducing stress and increasing well-being among the teachers.

Studies on the effects of low well-being among teachers:

Alvi, Altaf & Khatoon (2022) in Effect of Depression, Anxiety and Stress on Mental Health of Teachers studied 200 participants of which 100 were male teachers and 100 female teachers. The results of the study were found to be consistent with previous findings that in the teaching profession, lower levels of life satisfaction and happiness are linked to burnout and increased psychological distress. Supported by further researches, psychological distresses have been found to contribute to increased teacher burnout. The results of this burnout include teacher absences, lower levels of job satisfaction and decreased effectiveness.

The findings indicated that loss of behaviour and psychological distress were positively related to stress which is consistent with the study on predicting teacher anxiety, depression and job satisfaction which discovered that teacher workload and student behaviour were strong predictors of teacher sadness; and that employment conditions were substantial predictors of teacher anxiety. Various sources of stress, anxiety and depression and teachers' workload contribute to physical and emotional exhaustion, deteriorated mental health, increased sick leave, reduced employment with economic consequences. The presence of occupational exhaustion related to stress in the workplace is constant and attention-grabbing, as it is one of the factors most associated with low levels of productivity at work and raises motivation to leave the profession. Teachers may develop depression as a psychological consequence of stressful events at work.

Studies on the status of teacher well-being in India:

Arockiasamy & Subramanian (2021) in Occupational Stress Of Higher Secondary School Teachers In Cuddalore District examined the well-being of 200 higher secondary school teachers from Cuddalore district. The study showed that out of 200, 17% of higher secondary school teachers have a low level of stress, 64% have an average level of stress and 19% have a high level of stress related to their occupation. The study also recorded that out of 96 male higher secondary school teachers, 16.2% showed lower levels of occupational stress, 64.2% showed average levels of occupational stress and 20.4% showed high level of occupational stress. The study further revealed that urban higher secondary school teachers have more occupational stress as the t-value of the test on urban teachers was 2.45, whereas the t-value of the test done on rural teachers was 1.96. Through the tests, it was also deprived that private school teachers had more stress than government school teachers.



Misra, M. (1986) aimed to assess the level of life satisfaction in the teachers teaching in different parts of Kolkata. The sample comprised of 345 teachers, out of which 180 were male and 165 were female. The level of meaning in life of the sample as measured by the PIL was found to be low, with the mean score 100.86. In the self-reporting item of general stressfulness, 46.38% rated, being a teacher as considerably stressful and 9.28% as extremely stressful while 9.8% rated it as not at all stressful. The study also revealed that female teachers are more burned out than male teachers. The mean personal accomplishment of the present sample is lower than the norm mean of the original MBI sample (PAF:36.01); (PAI: 39.70). The Calcutta teachers thus, have a high level of burnout in the Personal Accomplishment Subscale.

Both scored stress (TSS) and self-reported stress (SRS) are positively and significantly related to the emotional exhaustion level and depersonalization level of the teachers.

In the study, 55.6% of teachers rated being a teacher as considerably or extremely stressful. This showed that school teachers are demotivated and lack a sense of fulfilment due to paucity of money, power and social status.

Kour, Wani & Kumar (2022) chose 120 teachers (60 from private schools and 60 from government schools) to check the perceived level of stress among them. The results indicated that the teachers of Jammu faced moderate levels of stress as the participants had scored 18.00 with minimum score of 8 and a maximum of 29 on PSS (Perceived Stress Scale). The government school teachers of Jammu were more stressed as compared to the private school teachers of Jammu. The private school teachers had a mean score of 18.62.

The research also found that self-esteem which is critical for the overall well-being of a teacher was low among government school teachers. The government school teachers had a mean score of 20.8 whereas private school teachers had mean score of 20.77.

Studies on the impact of teacher well-being on students' lives

Wan, Lin, Yirimuwen, & Qin (2023) framed a structural equation model analysis was conducted with adolescents' teacher-student relationship as the independent variable, openness and empathy as the mediating variables, and emotional intelligence as the outcome variables. The results showed that the direct effect can only independently explain 20.24% of the effect of the teacher-student relationship on emotional intelligence. However, the indirect effect can independently explain 79.76%. More precisely, the indirect effects of openness, empathy and empathy jointly explained 41.71%, 29.85%, 96% and 8. 20% of the variance respectively. The study revealed that the teachers' support, encouragement and unconditional positive attention can promote the development of openness in the personality factors of students and the formation of the sound personality. When the teachers try to understand students' interests, attend to their emotions such as fears and concerns, and give them motivation and support, the students feel that the teacher is working for their well-being and that they feel cared for, helped and considered. It has been found that adolescents with positive teacher student-interactions, are more likely to develop openness by engaging in interactions in the school environment that focus on sharing and collaborating. Moreover, in student-teacher interactions, are more likely to develop openness by engaging in interactions in the school environment that focus on sharing and collaborating. Moreover, in student-teacher interactions, teachers often guide them to identify the emotions of others and understand the reasons behind their emotions and behaviours, which may contribute to the development of students' empathy skills. As empathy develops, individuals become more proficient at incorporating emotional knowledge to make sense of different social situations.



Granziera, Martin, & Collie (2023) studied the NAPLAN test report that was administered for years 3 and 5, focusing on the elementary teachers and schools in Australia. NAPLAN data for each school was collated to coincide with the year in which teacher data from that school were collected. Five domains were examined including reading, writing, spelling, grammar and numeracy. The study revealed that the students attending schools in which teachers higher or average levels of emotional exhaustion achieved lower scores in a standardised measure of achievement. The study suggested that teachers who are exhausted may lack the psychological and physical resources to invest in planning lessons, preparing materials and delivering lessons which are key determinants of students' achievement.

Klusmann, Kunter, Trautwein, Lüdtke & Baumert (2008), drew a sample of 318 teachers and their students, this study explored the differences in the performances of the teachers of the four different types, namely healthy-ambitious (H type), Unambitious type (U type), Excessively ambitious type (A) and Resigned type (R) and examined whether these differences are systematically associated with their students' achievement and motivational experience. The H type with high scores on both occupational engagement and resilience, is seen as the best adapted pattern. The U type is characterised by low occupational engagement but high resilience. The remaining two types are thought to be at risk for burnout and stress. The excessively ambitious, A type scoring high on engagement and low on resilience, is characterized by excessive engagement, striving for perfection, and an inability to recover emotionally from work. The Resigned type (R) is characterized by low engagement and low stress resistance.

The study found that the self-regulatory behaviours of the teachers were associated with students' motivational experience. Students taught by teachers of the H type reported pronounced experiences of autonomy and competence than did students taught by teachers of the R type. It was seen that only teachers of the H type had the capacity to respond adaptively to their students' needs, as reflected in student reports of personal support, interaction, tempo and cognitive activation.

Students in classes taught by engaged and resilient teachers reported more positive motivational experience in Mathematics lessons than students in classes taught by any of the other teacher types. Because this effect is mediated by teachers' personal support and, to a lesser degree, by the perceived level of activation cognitive activation, this result emphasises that these aspects of instructional performance are crucial for students' motivation.

Jennings, P. A. (2015). Early childhood teachers' well-being, mindfulness, and self-compassion in relation to classroom quality and attitudes towards challenging students.

This paper examined the relationships between mindfulness and self-compassion and dimensions of classroom quality and teacher student-relationships in order to better understand the naturally occurring variation in pre-schools, rather than a test of an intervention designed to enhance mindfulness and self-compassion. For this, 35 teachers from a major metropolitan area of Northern California were interviewed. The findings from the correlations between the class domain scores and negative effect shows that depression, emotional exhaustion and depersonalization were negatively correlated with all three dimensions of class, viz- emotional support, classroom organization and instructional support.

METHODOLOGY

A clearly defined methodology provides a structure to the research process and gives the researcher a clear vision of the work to be done. It also helps the other students to understand how the research was carried out. The objectives of the study and the tool to achieve them is described in this section.

**Objectives:-**

- To gauge the status of teacher well-being in India
- To understand the various aspects of students' life that are impacted by teacher well-being.

Tools:-

Secondary data analysis was done on existing literature on the topic of teacher well-being. Google scholar was the primary source of this information.

Results:

The results of the study are outlined in this section. The tables and charts provided have been drawn from the results of the existing literatures.

1. Wilss, L., Pillay, H. K., & Goddard, R. (2005). Well-being, Burnout and Competence: Implications for Teachers:

This study revealed that out of 157, half of the teachers thought that the effort they put into their work was greater than the rewards.

This group of teachers reported higher burnout levels on the MBI scale as shown in the table below.

PCOISS and MBI Comparisons for various cohorts of teachers.

	PCOISS		MBI (Subscale Means)		
	n	Mean	EE	DP	PA
Gender					
Males	39	87.70	23.80	7.36	37.97
Females	112	86.73	21.85	5.42	38.66
Working Hours					
Full-time	127	88.21	23.14	6.08	38.91
Part-time	27	80.96	18.74	5.19	36.46
Marital Status					
Married	108	87.39	22.69	6.08	38.51
Not Married	25	84.00	22.56	5.36	37.63
Serious consideration to leaving current job					
YES	45	83.00	28.36	8.76	36.02
NO	106	88.59	19.84***	4.72***	39.48*
Teacher respondent view of Workload Equity					
Effort > Rewards	74	82.41	28.64	7.95	36.47
Rewards > Effort	83	91.23**	16.56***	4.03***	40.36**

(Source: Wilss, L., Pillay, H. K., & Goddard, R. (2005). Well-being, Burnout and Competence: Implications for Teachers)

2. Arockiasamy, S., & Subramanian, P. (2021). Occupational Stress Of Higher Secondary School Teachers In Cuddalore District:

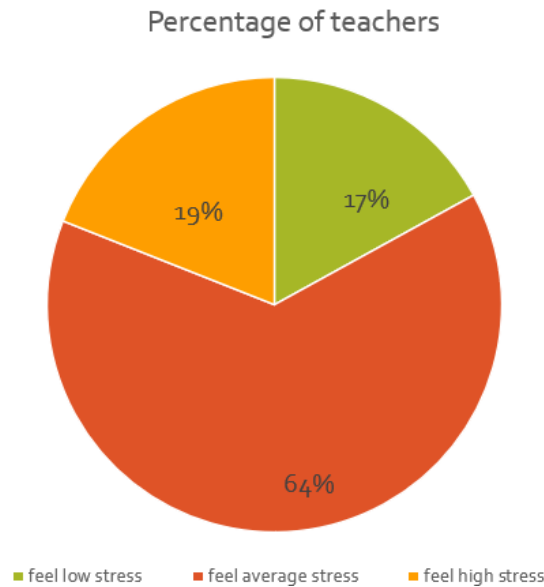
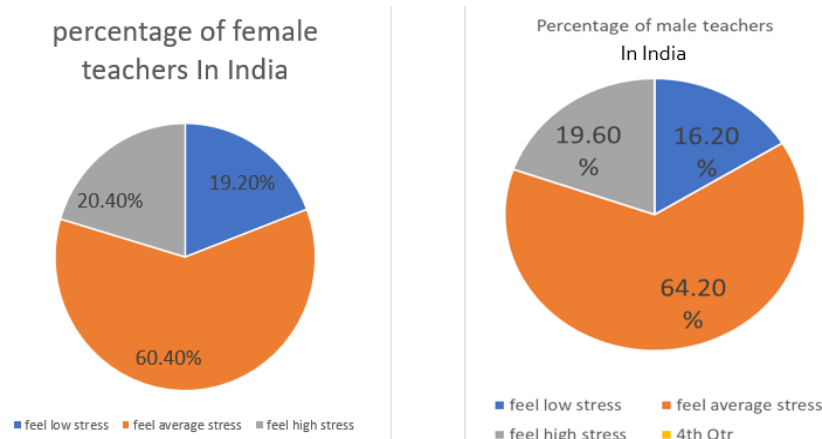


Chart 1

A study conducted on occupational stress level in teachers show that out of 200, 17% of higher secondary school teachers have low level of stress, 64% have an average level of stress and 19% of the teachers have high level of stress. (Pie Chart 1)

Out of 96 male higher secondary school teachers, 16.2 % showed lower level of occupational stress (Chart 2)



Pie Chart 2

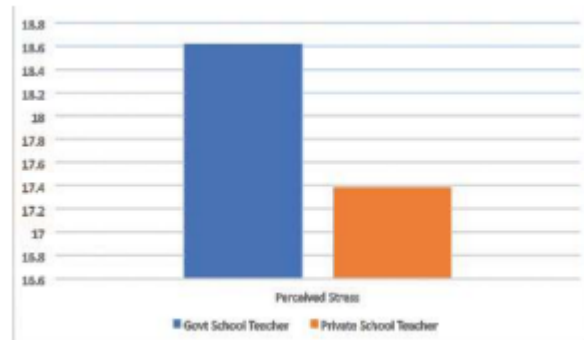
64.2% showed average level of occupational stress. 20.4 % showed high level of occupational stress.

Urban higher secondary school teachers have more occupational stress as the t-value of the test on urban teachers was 2.45 and on rural teachers was 1.96.

3. Kour, S., Wani, N., & Kumar, S. (2022). Self-Esteem and Perceived Stress among Private and Government School Teachers in Jammu: A Comparative Study.

4.

This paper showed that the government school teachers of Jammu were more stressed than the private school teachers. Private school teachers had a mean score of 17.38 whereas the government school teachers had a mean value of 18.62 as shown in the graph below.



(Source: Kour, S., Wani, N., & Kumar, S. (2022). Self-Esteem and Perceived Stress among Private and Government School Teachers in Jammu: A Comparative Study)

4. Wan, S., Lin, S., Yirimuwen, Li, S., & Qin, G. (2023). The Relationship Between Teacher-Student Relationship and Adolescent Emotional Intelligence: A Chain-Mediated Mediation Model of Openness and Empathy:

This paper proves that there is an indirect relationship between teacher well-being and student achievement as shown in the picture below.

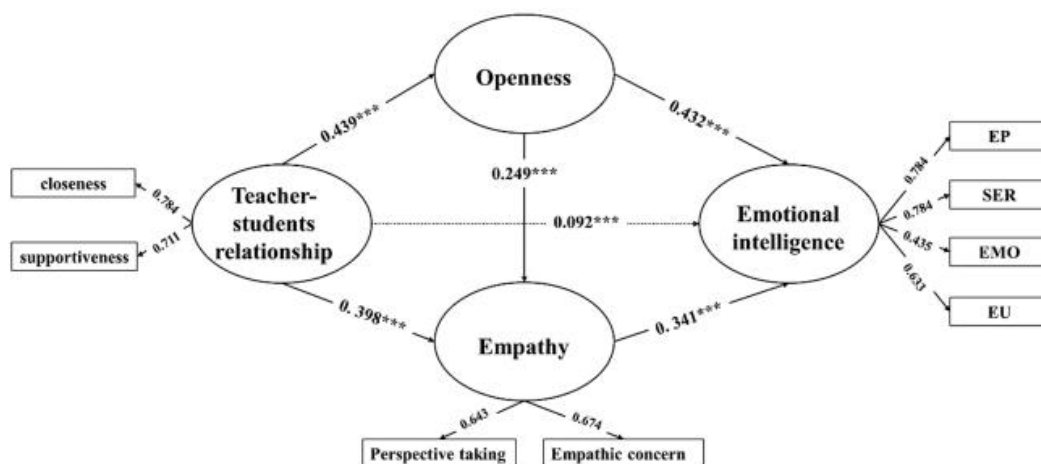


Figure 1 Structural equation model regarding the mediating effects of openness and empathy on the association between teacher-students relationship and emotional intelligence.

Notes: All the coefficients are standardized estimates. ***p < 0.001.

Abbreviations: EP, emotion perception; SER, self-emotional regulation; EMO, emotion management of others; EU, emotion utilization.

(Source: Wan, S., Lin, S., Yirimuwen, Li, S., & Qin, G. (2023). The Relationship Between Teacher-Student Relationship and Adolescent Emotional Intelligence: A Chain-Mediated Mediation Model of Openness and Empathy.)



5. Klusmann, U., Kunter, M., Trautwein, U., Lüdtke, O., & Baumert, J. (2008). Teachers' occupational well-being and quality of instruction: The important role of self-regulatory patterns:

This paper exhibits that self-regulatory styles in teachers were associated with students' learning. Results of Regression Analysis Testing showed that healthy- ambitious teachers were more adaptive and engaged in teaching.

Students taught by such teachers reported pronounced experiences of autonomy and competence as compared to the students taught by other teachers.

DISCUSSION

The present study aimed to investigate the prevalence of low well-being among the teachers. It was found that 25% and 40% of beginning teachers in countries in the Western world are leaving teaching as they are burned out. A study conducted in Australia showed that 50% (half) of the respondents from the field of teaching reported lower well-being. The teachers who thought that the efforts they were putting at work were greater than the rewards showed higher burnout levels. Consequently, their PCOISS (Perceived Coping of Internal States Survey) was lower with a mean value of 83.00. In case of Indian teachers, it was found that 17% of higher secondary school teachers have low level of stress, 64% have an average level of stress and 19% have high level of stress related to their occupation. More female teachers were facing occupation related stress. 20.40% female teachers faced low level of occupational stress, 60.40% faced average level of occupational stress and 19.20% faced high level of occupational stress. This was quite high when compared to the stress level in male teachers. Out of 96, 16.2% showed lower level of occupational stress, 64.2% showed average level of occupational stress and 20.4% showed high level of occupational stress. The studies also revealed that urban higher secondary school teachers have more occupational stress as the t-value of the test was 2.45, whereas, the t-value of the test done on rural teachers was 1.96. In the Cuddalore district of Tamil Nadu, private school teachers had more stress than the government school teachers. On the other hand, a study conducted in Jammu revealed that the government school teachers had more occupational stress with a mean score of 18.62 whereas the private school teacher had a lower level of occupational stress with a mean value 17.38. Overall, the participants of the test had moderate level of stress with a score of 18 with minimum score of 08 and maximum of 29 on PSS (Perceived Stress Scale). It was also shown through the results that self-esteem, which is an important determinant of well-being, was low among the government school teachers. The government school teachers had a mean score of 20.8 whereas, the private school teachers scored 20.77. Another study on the teachers of Kolkata showed that the level of 'meaning in life' was low with a mean score of 100.86 on the PIL, where the total number of respondents were 345. 46.38% people rated, being a teacher as considerably stressful, 9.28% rated it as extremely stressful while 9.8% rated it as not at all stressful. Female teachers had more occupational stress compared to their male colleagues. Overall, 55.66% of teachers considered teaching to be extremely stressful.

The study also sought to examine the impact of teacher well-being on students' lives. The results showed that the direct effect can only independently explain 20.24% of the effect of teachers' well-being on students' lives. However, the indirect effects of openness -empathy and empathy jointly explained 41.71%, 29.85%, 96% and 8. 20% of the variance in emotional intelligence level of students. The results proved that teachers' support, encouragement and unconditional positive attention can promote the development of openness in students. The teachers with average or good well-being can be adaptive and engaged to cater to students' needs and preferences. Such teachers not only understand their own emotion but also help the students to understand their own emotions. It helps in developing socio-emotional skills in students. Another study found that



teachers who show better self-regulation such as the (H)- Healthy-ambitious type help the students to gain autonomy and increase their level of competence. Students taught by such teachers who have high scores of 7, 26, 56 in tempo, cognitive activation, personal support respectively, exhibit better classroom performance and engagement. Studies found out that students in classes taught by such teachers, who are engaged and adaptive, reported more positive motivational experience in Mathematics lessons than students in classes taught by any other type of teachers.

CONCLUSION

The well-being of teachers is a critical factor in the overall success of education systems. A positive and supportive environment for teachers not only benefits them individually but also has far-reaching implications for students and the education system as a whole. Students taught by teachers with good well-being not only develop strong character traits but also experience academic growth. The equanimity of teachers creates a positive and supportive classroom environment where students feel comfortable and confident to participate in classroom learning and take academic risks. This leads to strong resilience, helping students to persevere through challenges in learning. A positive outlook and growth mind-set, epitomized by the teachers, encourage students to accept learning opportunities and strive for scholastic success. Furthermore, emotionally healthy educators inspire motivation, leading to increased student engagement, escalating overall academic performance.

Limitations:

- **Scarcity of research on the topic:** the data on the relationship between teacher well-being and students' achievement is remarkably limited as very little research has been conducted on the topic of teacher well-being and its classroom implications.
- **Limited control over data collection:** Researcher has no control over the design, methodology and data collection process of the original study. This lack of control may introduce biases or limitations that were not considered in the initial research.
- **Mismatched variables:** The variables collected in the original studies may not align perfectly with the specific research questions related to teacher well-being. This mismatch can limit the depth and precision of the analysis.
- **Quality and accuracy of data:** The reliability and validity of the data depend on the quality of the original study. If the data is flawed, incomplete or inaccurate, it can compromise the integrity of the secondary analysis.
- **Limited scope and depth:** Secondary data may not provide the depth and breadth of information needed to explore certain aspects of teacher well-being. Researchers may miss out on nuanced details that could be crucial for a comprehensive understanding of the phenomenon.
- **Temporal and Contextual differences:** The original study may have been conducted in a different time period or context, and changes in societal, educational, or environmental factors could impact the relevance and applicability of the findings to the current situation.



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FROM MARGINS TO MAINSTREAM: EQUITY AND INCLUSION FOR DALITS IN UNIVERSITY STEM PROGRAMS

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Abstract

This paper highlights the problems faced by marginalized Dalit students in accessing and completing higher education in STEM fields, including discrimination and lack of supportive ecosystems to nurture their talent. Despite policy and government interventions, underrepresentation persists. The literature review analyses research on the historical, sociocultural and institutional barriers underpinning this exclusion. Based on statistics and studies, key findings regarding problems at the school and university levels are highlighted along with recommendations across stakeholders to drive greater Dalit participation and success in STEM higher education.

Keywords: *Marginalization, Equality, Dalit, Rights, University, Higher Education.*

Introduction

"The outcaste is a bye-product of the caste system. There will be outcastes as long as there are castes. Nothing can emancipate the outcaste except the destruction of the caste system."

---- B R Ambedkar

Annihilation of Caste: The Annotated Critical Edition

The 'Dalits' or the 'marginalized' are the parts of society in modern India who have lived in this country bereft of amenities and opportunities since time immemorial. The lack of opportunities was the direct result of the power that the upper or the privileged sections held creating an imbalance and status quo, making the Dalits feel they were innately inferior and thus helpless. Their identity was questioned and therefore their self-respect stood compromised; even though it is as much in their right to have a fair share in the produce. The Dalits are sections of the Indian community who sustained the supposedly privileged through their labour and toil. The word "marginalized" suggests oppression and denial of basic rights, thus drawing a line of segregation between the centre of control and a place which is made to feel obliterated. Ironically thus, the word "others" by which one can construct an "us versus them" theory has been given place in modern society which has only widened the gaps in our country.

Science, technology, engineering, and mathematics (STEM) is a superordinate used to group together the definite but associated technical disciplines of science, technology, engineering, and mathematics, which in India has become the hub of oppression as seen by the recent studies. The Wire India saw that over 13,000 SC, ST and OBS students dropped out of central universities, IITs, IIMs since 2018. (source: THE WIRE, December 5th, 2023) as stated by Minister of State for Education, Subhas Sarkar said. He said that "In order to proactively address any issues of SC/ST students, institutes have set up mechanisms such as SC/ST students' cells, Equal Opportunity Cell, Student Grievance Cell, Student Grievance Committee, Students



Social Club, Liaison officers, Liaison Committee etc. Further, University Grants Commission (UGC) has issued instructions over time for promoting equity and fraternity amongst students," the minister said.

The Constitution of India grants equal access to education for all classes of people irrespective of caste, creed, religion, language and sex, furthermore it has been more than fifty years since reservation has been provided to the Scheduled Castes, Scheduled Tribes and other backward communities to ensure protection irrespective of gender, still the Dalits in India lag behind in the field of higher education as recorded in the reports of the national commission on scheduled castes and scheduled tribes. They remain poor, illiterate and lack the requisite knowledge for competing in the modern world and remain deeply tied to land and transitional occupations which offer zero to very few possibilities of upward mobility.

Today Dalit students are still segregated from the rest and mistreated by the upper castes' teachers. Calling caste names, verbal abuse and assorted humiliation acts are common practice in many schools. This might be the very reason for high dropout rates among Dalits. The dropout rate is still a very important aspect that needs special attention. If we cannot reduce the dropout rate, we will not be able to think of higher education for these communities especially in the IITs and IIMs. In Graduate and non-technical there is minimal improvement. It may be because they have realized the future prospect of these courses. In engineering and medical courses there is slight improvement in their enrolment. This decadal variation has shown that there is extremely less progress in the enrolment of marginalized communities in the professional courses. Such is the condition of inclusion of Scheduled Castes and Scheduled Tribes, that the premier institutions such as IITs and IIMs do not even have a single faculty member from these categories. Of the 784 sanctioned faculty posts in 18 IIMs, just two are from the ST community, according to data submitted in Parliament by the Ministry of Human Resource and Development (HRD) in December, 2023. The situation is worse for the SCs who have only eight faculty members while there are only 27 members from the OBC category. Around 590 of the posts are occupied by the general community while the remaining have not been filled. Together the marginalized sections make up for only 6% of the total faculty members in IIMs and that in the IITs is equally grim as there are 329 OBCs, 149 SCs and a mere 21 for the ST community. In effect, across 23 IITs, including new and old, only 9 per cent of the current faculty are either SCs, STs or OBCs. The figures rise amidst serious concern that social inclusion could take a further hit with the new University Grants Commission (UGC) order instructing colleges to hire department-wise as opposed to institution-wise. The new roster system is expected to affect the reservation formula in educational institutions. (Source: The Print. December 6th, 2023)

The discourse on Dalit representation in STEM fields has been analysed in various scholarly articles and media reports. *Nature* published an article titled "India's Scientific Diversity: Caste Barriers," which examines the underrepresentation of Dalits in India's elite research institutions, emphasizing the dominance of historically privileged castes beyond the PhD level. The *Financial Times* article, "Caste Remains Off-Limits in Corporate India's Drive for Diversity," highlights how caste discrimination is often overlooked in corporate India's diversity initiatives, affecting Dalit representation in STEM. Additionally, the book *Dalits in the New Millennium* includes a study titled "Portrayal of Dalits in the Media: A Study of Select Newspapers from Uttar Pradesh," which explores how media representation shapes public perception and opportunities for Dalits, indirectly influencing their participation in professional domains like STEM. Another significant study, "Representation and Exclusion of Dalits in Media," examines the correlation between media representation and societal inclusion, shedding light on the systemic barriers Dalits face in various professions, including STEM. Lastly, *Livewire* published "The Dawn of Dalit-Led Media and Journalism," which discusses the emergence of Dalit-led media platforms and their role in advocating for equitable representation across different sectors, including STEM. These references collectively highlight the systemic challenges and ongoing efforts to increase Dalit participation in STEM disciplines.



Need of the Study

Understanding Dalit history and battles is pivotal for grasping the mind-boggling elements of social unfairness and separation pervasive in social orders in STEM. The Dalit experience features getting through the tradition of station-based mistreatment and fills in as a focal point through which more extensive issues of imbalance, underestimation, and civil rights can be analysed.

Besides, concentrating on Dalits encourages sympathy and fortitude, testing biases and cultivating a more comprehensive society. By digging into the financial circumstances, social commitments, and political developments of Dalits, people can foster a more profound comprehension of the different embroidery of human encounters and the significance of value and basic liberties.

Besides, Dalit concentrates on offering bits of knowledge into the interconnection of abuse, uncovering how station separation converges with variables like orientation, religion, and class to intensify underestimation and hardship. This interconnected viewpoint is vital for creating thorough procedures to address foundational shameful acts and advance social balance.

Ultimately, reading up on Dalits is fundamental for encouraging compromise and advancing social union. By recognizing authentic shameful acts and enhancing Dalit voices and stories, social orders can pursue mending past injuries and building more comprehensive networks grounded in nobility, regard, and equity for all people, paying little heed to station or foundation, especially in higher STEM backgrounds.

Review of Literature

The present chapter provides a summary of the topic of Dalit Discourse on STEM conducted on the basis of discrimination Dalits face, seclusion and othering, elitism, religion and caste and language barrier. The literature discussed includes:

- Historical analyses tracing denial of all education for Dalits as part of caste-based oppression and resulting legacy of exclusion
- Sociological examinations of normalizing implicit and explicit prejudices that drive continued discrimination and gatekeeping of higher STEM education access
- Quantitative and policy analyses highlighting gaps in existing equity-driven schemes to illustrate need for better targeting and delivery mechanisms to uplift marginalized groups.

Discrimination faced in Education

Information from five higher education institutions in India and the United Kingdom was collected to explore experiences of students and staff regarding equality and discrimination as part of UK-India Education and Research Initiative (UKIERI), Thornton al. (2010). It was observed that "separation of groups on the higher education campus is pervasive and ubiquitous." The segregation was done primarily based on race, nationality, religion, caste, class or gender.

Ovichegan (2013) in another study on experiences of Dalit students in a prestigious Indian university concluded that the university is a major tool for caste-based division. Dalits face overt and covert discrimination based on caste at the premier institutions. (Ovichegan, 2013, p.1). Dalits lack cultural capital and often less funds as also seen by Geeta Nambissan. (Nambissan, 2009, p.11).



Seclusion and Othering

Problems do not cease for the first generation of learners from Dalit communities as stated by Sukumar (2013) who had to come to terms with an alien curriculum along with entrenched pedagogical prejudices. The first generation of learners from the Dalit families lack people who can provide the necessary guidance required to get admission in these universities and regarding fee structure, courses, hostel facilities, and other related matters which leaves them at the hands of the administration who mostly have a lackadaisical attitude towards them. The discrimination could be seen predominately in four areas: experiences of prejudice while seeking admission, the stigma and attitude shown by teachers, animosity and exclusion from fellow students, and apathy and sometimes opposition from administrative officials. Singh (2013) further argued that, Dalits face challenges not only based on the grounds of poverty but extreme violence based on caste-based apathy while getting admitted into the universities. (Singh, 2013). They are also excluded from 'dignity', 'individual freedom' and 'meaningful employment' (Jeffrey, Jeffrey & Jeffrey: 2004, p.976). A large section of the Indian Dalits is denied education and access to high income yielding jobs or occupations which impart power. Hence, in India, caste has been the determinant of class positions resulting in acute inequality in the distribution of jobs or positions of power which are mostly reserved for the privileged. (Mehta and Kapoor 1998:37)

Government reports and studies have highlighted the underrepresentation of Dalits in India's STEM fields. For instance, a 2007 government committee reported widespread discrimination and harassment against Dalit and Adivasi students at the All-India Institute of Medical Science in New Delhi, leading these students to seek safety by isolating themselves in specific hostel areas.

Additionally, the Indian government's reservation policy mandates a 15% quota for Dalits (Scheduled Castes) and a 7.5% quota for Adivasis (Scheduled Tribes) in jobs in the public sector and in educational institutions to address historical marginalization.

In spite of these measures, studies have found that historically privileged castes continue to dominate many of India's elite research institutions, indicating ongoing challenges in achieving equitable representation in STEM fields.

An Elitist View

As Trow (1970, 1973) argues that when access is highly limited as for a section of the elite, higher education, it is generally seen as a privilege, either of birth or talent or both. But, when it moves into the mass system, people increasingly begin to see entry to higher education as a means of upward mobility for those who are endowed with certain formal qualifications. STEM in India including other areas have become elitist in the sense that they look down upon people coming from poor and backward communities and treat them as an outcast. In Bengali, terms such as, "chhotolok" and "bhadralok" have given rise to every section in the society, and not just education. (Batabyal, 2013)

Religion and caste

In India, Veda (religion), Varna (caste) and Vidya (education), are all intertwined, according to Borooah & Iyer (2005). R. K. Nayak's (2000) description in this regard is revealing. Nayak writes:

"Almost every fourth Indian is a Dalit, and is easily identified. He may be a beggar near a temple or a church, a permanent squatter, a prematurely old person in his forties, a child labourer in a factory, a pauper in a village, a child domestic help, a porter, a rickshaw puller in a city, a bonded labourer, a migrant slum-dweller. And a Dalit woman is always ill clad, a bag of bones, often with a malnourished child in her arms, a



temple Devadasi.” There people who are in the lower strata of religion and caste and money receive no education, let alone in STEM or any other higher educational field.

Language Barrier

As Edward says, language forms identity, hence to discard a child’s language will likely decrease their self-worth which can affect their view of the world and success. Prof.Kancha Ilaiah, has summarized the pro- English narrative among Dalits: “Over time, English has become the common language of the global science and technology market and the overall economy.” Children who attend government schools are often denied the right to learn basic English compared to their rich counterparts in private English medium schools, which leaves them to think they are not worthy for achieving anything in the global economy.

Additionally, because of their educationally deprived social background, Dalit students lack English language skills, both aural and oral, which results in further segregation of Dalit students. For centuries, caste had been a determining factor in education, work and employment. Shah therefore rightly points out, ‘higher education is still mainly open to the higher castes.’ (Shah 1960)

Key Arguments

Several scholars have addressed the barriers Dalits face in higher education and professional STEM fields. Guru (2000) highlights how caste is still an essential factor to influence social mobility, limiting Dalits' access to prestigious educational institutions. Deshpande (2013) argues that despite positive action policies like reservations, elite institutions remain exclusionary due to subtle forms of caste-based discrimination. Anand (2021) discusses how Dalit students in premier institutions such as the Indian Institutes of Technology (IITs) and medical colleges experience implicit and explicit caste biases, which affect their academic performances.

Furthermore, Bal (2018) critiques the meritocratic argument used against reservations, asserting that it ignores historical oppression and the unequal playing field. Studies like those by Thorat and Newman (2010) provide empirical evidence of caste-based discrimination in higher education, demonstrating that Dalits face exclusion in peer interactions, faculty engagement, and recruitment in STEM disciplines. These studies underscore that caste remains a significant impediment to educational equity in India’s STEM ecosystem.

Government Reports and Policy Interventions

Government reports have consistently acknowledged the disparities in Dalit representation within STEM. The Sachar Committee Report (2006) and the Thorat Committee Report (2007) highlight the systemic exclusion of marginalized communities in premier educational institutions. The Thorat Committee’s investigation into AIIMS (All India Institute of Medical Sciences) revealed rampant discrimination against Dalit students, including social ostracization and unequal grading practices. Additionally, the Annual Higher Education Report (2020) from the Education Ministry notes that Dalits constitute a significantly lower percentage of students in STEM disciplines compared to their overall population percentage, despite reservation policies.

The execution of positive action policies, like the 15% reservation for Scheduled Castes in public institutions, has improved access but has not addressed retention and integration sufficiently. Reports from the University Grants Commission (UGC) indicate that dropout rates among Dalit students in STEM fields remain extreme due to socio-economic pressures, lack of mentorship, and institutional discrimination.



Gaps in Literature

While existing content provides a strong foundation for understanding Dalit underrepresentation in STEM, several gaps remain. First, most studies focus on access to higher education but lack comprehensive analyses of Dalit representation in STEM employment and research. There is limited empirical research on workplace discrimination in STEM industries, an area requiring further exploration. Second, while assenting policy actions have been studied extensively, their long-term impact on Dalit career progression in STEM fields remains underexplored.

Another gap is the role of emerging Dalit-led advocacy and digital activism in countering STEM exclusion. Social media platforms and alternative media channels have provided a space for Dalit scholars and professionals to challenge caste discrimination in STEM, yet academic research on this phenomenon is minimal. Lastly, there is limited intersectional analysis exploring how caste intersects with gender and socio-economic status in shaping Dalit experiences in STEM education and careers.

Method Objectives

This study has the following objectives:

- To gauge the present status of Dalit Education in Higher Education in India, especially STEM.
- To understand the various facets of life that are impacted by Dalit wellbeing.
- To assess the mindset towards Dalit Education in India
- To assess the linkage between the Marginalized and the non-Marginalized
- To understand how elitism works in STEM
- To assesses the socio-cultural problems arising due to the dearth of Dalit Inclusion.

Tools

Primary Data Analysis was done on information received from various individuals coming from STEM backgrounds. A list of questions for the survey was created on Google Forms and sent to these students and the link was shared via email and WhatsApp application. The respondents had to sign in via their Google Accounts in order to gain access to the forms. This ensured authenticity of the respondent and avoided double-filling for forms by any single respondent.

Sample

Primary data was collected from 13 people out of whom 3 are male and 10 are female. Their age ranges from 24 -29 years and are based in different metropolitan cities either for work or education. all of them are postgrads or are in their graduation years. Some of them are married and hold jobs. They either come from joint, single or double parent nuclear families.

Rationale

The sample size of 13 participants from different metropolitan cities was intentionally chosen to prioritize in-depth qualitative analysis over broad statistical representation. Given the extensive geographical coverage, the study aimed to capture a range of experiences while maintaining a manageable scope for detailed, case-based exploration. A larger sample, though desirable for generalizability, would have risked reducing the intensity of individual narratives, which was the key for understanding the nuanced socio-cultural and institutional barriers faced by Dalits in STEM. Additionally, selecting participants from multiple metropolitan cities ensured that the study incorporated diverse regional contexts while focusing on key structural challenges rather than city-specific factors. The thought behind this approach harmonizes with



qualitative research methodologies that emphasize depth over breadth, enabling a more focused analysis of systemic discrimination, access to opportunities, and social mobility patterns within STEM fields.

Questionnaire

- The following questions were asked to the candidates.
- Do/ did you face any aversion from your classmates?
- Do/ did you face any problems while interacting with the faculty?
- Did you face discrimination in job placements?
- Did you face any discrimination while your papers were being graded?
- Were you included in class activities like dance, drama et all?
- Did you feel the teachers have sidelined you?
- Have you been made to feel inadequate due to being Dalit?
- Have you been subjected to derogatory comments regarding quota?
- Were hostel facilities or rental preferences denied?
- Were scholarships offered to you?
- Were questions asked about your monetary background?
- Have you ever been treated as an “untouchable”?
- Did you face harassment being a Dalit Woman? (only asked to women)
- Were you charged the same admission fee as others?
- Were you charged the same month fee as others?

Responses

The responses, initially represented in graphs are shown in the following table.

Results

- 75% faced aversion from their classmates while the rest didn't or are unaware.
- 61.5% faced problems interacting with the faculty while the rest didn't or are unaware.
- 38.5% faced discrimination in job placements while the rest didn't or are unaware.
- 30.8% faced discrimination while their papers were being graded while the rest didn't or are unaware.
- 75% feel they were not included in class activities.
- 38.5% feel the teachers had sidelined them.
- 76.9% feel they have been made to feel inadequate due to being Dalit.
- 84.6% have been subjected to derogatory comments regarding quota.
- 8.5% feel hostel or rental facilities were denied.
- 61.5% feel scholarships were not offered to them.
- 84.6% said they were asked questions about their monetary background.
- 53.8% said they were treated as an untouchable.
- 41.7% said they faced harassment being a Dalit woman, 8.3% said they faced harassment not directly but by words or actions of others, at times being bullied.
- 53.8% students were charged equal admission fees.
- 69.2% students were charged equal monthly fees.



Table 1.

PERCENTAGE	PROBLEMS
75%	faced aversion from their classmates while the rest didn't or are unaware
61.5%	faced problems interacting with the faculty while the rest didn't or are unaware.
38.5%	faced discrimination in job placements while the rest didn't or are unaware
30.8%	faced discrimination while their papers were being graded while the rest didn't or are unaware
75%	feel they were not included in class activities.
38.5%	feel the teachers had sidelined them.
76.9%	feel they have been made to feel inadequate due to being Dalit.
84.6%	have been subjected to derogatory comments regarding quota.
8.5%	feel hostel or rental facilities were denied.
61.5%	feel scholarships were not offered to them
84.6%	said they were asked questions about their monetary background
53.8%	said they were treated as an untouchable
41.7%	said they faced harassment being a Dalit woman, 8.3% said they faced harassment not directly but by words or actions of others, at times being bullied.
53.8%	students were charged equal admission fees
69.2%	students were charged equal monthly fees

Source: Google Form

Discussion

It is clear from the given data how Dalit students have been sidelined from the mainstream community. Dalit students face numerous challenges in pursuing quality education, particularly at the university level in STEM disciplines. These can be summarized in:



Social Discrimination and Bullying: Dalits routinely encounter bullying, harassment, isolation and discrimination from classmates, professors and university staff due to deep-rooted caste prejudices. This creates a hostile environment.

Lack of Social Capital: Most Dalits are first-generation learners lacking social capital - networks, role models and mentors - to navigate higher education and competitive fields like STEM. This information asymmetry and opacity hinders access.

Financial Barriers: Due to intergenerational socioeconomic disadvantage, many Dalits cannot afford expenses related to higher education such as tuition fees, learning materials, accommodation, and transportation. This is a huge barrier.

Curriculum Gaps: Dalit students often study in socioeconomically disadvantaged schools with fewer resources, large pupil-teacher ratios and less qualified teachers. This results in knowledge and skills gaps that disadvantage them in higher STEM education.

Available data and studies reveal alarming realities about problems faced by Dalits in Indian universities, particularly in STEM: In 2019, out of 903 episodes of caste-based discrimination in universities recorded nationally, 718 occurred in STEM and management colleges. This indicates a strong bias. National Survey of Student Engagement data indicates Dalit students experience significantly lower support from their universities compared to dominant caste peers. They report less academic challenge, lower perceptions of overall support and poorer quality interactions. NCERT study shows that non-Dalit faculty held strong explicit and implicit caste biases leading them to evaluate Dalit students' academic skills lower, discourage their participation and offer them fewer opportunities. Caste hierarchies get reproduced. A MU report indicates that 45% of Dalit students in STEM fields report facing physical or verbal abuse from faculty. 36% report social isolation and non-cooperation for assignments from other students. Suicide rates among Dalit university students due to discrimination are substantially higher than non-SC/ST groups as per official statistics from MHRD. Caste prejudices literally cost Dalit students their lives.

The National Education Policy (NEP), 2020 emphasises ensuring of inclusive, equitable and quality education for all. It provides that special attention will be given to reduce disparities in the educational development of Scheduled Castes and Scheduled Tribes. It also provides that all students, irrespective of their place of residence, should have a quality education system, with particular focus on historically marginalized, disadvantaged and under-represented groups. Education is a great leveller and is the best tool for achieving economic and social mobility, inclusion and equality. Initiatives have been put in place to ensure that all students from such groups, despite innate obstacles are provided various targeted opportunities to enter and excel in the educational system. Further, NEP 2020 mentions that to facilitate learning for all students, with special emphasis on Socioeconomically Disadvantaged Groups (SEDGs), the scope of education will be broadened to facilitate multiple pathways to learning involving both formal and informal education modes.

Tackling the Problems

Eradicating the deep-rooted problems faced by Dalits in higher STEM education requires coordinated initiatives across policy, institutions, civil society and communities.

Policy Level

Enact equity-driven policies for disadvantaged groups like expanding scholarships, hostels, remedial coaching and financial aid earmarked for Dalit STEM scholars. By introducing proportional reservation for



Dalits in faculty, leadership roles and decision-making bodies like Academic Councils and Boards of Studies and mandating intensive compulsory training for faculty, students and staff on caste sensitization, unconscious bias and inclusion of marginalized groups, discrimination can be curtailed.

Institutional Level

By establishing robust mechanisms for reporting caste-based discrimination, fund specialized units to offer counselling services tailored to Dalit students and driving cultural change via compulsory ethnicity/gender studies courses highlighting perspectives of disadvantaged groups.

Civil Society Level

Discrimination can be curtailed by mentoring programs that match Dalit university students with professionals who guide them in navigating STEM higher education and creating Dalit faculty and student associations that offer peer support systems and advocacy platforms against discrimination. Also, by using media advocacy for public awareness campaigns humanizing challenges faced by Dalit students in higher education.

Societal Level

By challenging normalized hierarchies that entrench caste privilege via grassroots community engagement and dialogue on equity and justice and also by partnering with schools and colleges to deliver anti-caste prejudice training exposing historical atrocities and modern forms of casteism. Celebrating high-achieving Dalit exemplars in STEM fields as role models motivating young students via mainstream and Dalit media channels can also help.

While Dalits comprise over 16% of India's population, they continue facing exclusion in accessing higher STEM degrees: Only around 9% of students enrolled in undergraduate level engineering colleges across India belong to the Dalit community, indicating dampened participation. Dalit faculty representation in central universities across STEM and technical departments averages just 3-4%, highlighting severe under-representation. Dropout rates among Dalit students are much higher than non-reserved category peers. Nearly 60% of Dalits drop out before completing undergraduate STEM degrees due multiple marginalizing factors. Among Dalits who enter scientific research or academia, over 87% report facing caste-based discrimination in recruitment, promotion processes and everyday workplace interactions. Dalits occupy fewer than 5% of senior decision-making administrative roles governing science and technology resource allocation and policy making nationally. Their perspectives get excluded.

The demarcation in STEM is rooted in Historical Legacy of Non-Access and Gatekeeping by Dominant Castes, an overwhelmingly upper caste demographic dominates most STEM departments. Their dominant cultural rituals, jargon and lack of targeted academic support alienates and intimidates Dalit students entering this ecosystem. They lack information networks on scholarships, accommodation, counselling services and academic assistance programmes. The government provides up to 15% seats across central higher education institutions for SCs and 7.5% for STs covering STEM disciplines scholarships, remedial teaching and relaxations. Similarly, youth campaigns, social media and corporate initiatives can also lessen the bias.

The institutionalisation of affirmative policy through proportional representation guarantees access to and inclusion of Dalits in HEIs funded and administered by the state. The transition to higher education, however, is not effortless; Dalits often lack the economic, social and cultural capital to enter or negotiate these educational spaces (Devi and Ray 2022). Even those who gain entry by proving their 'merit' in various



stages of ruthless entrance examinations experience insurmountable challenges, hostility and discrimination from their upper-caste peers, faculty and administration who hegemonize these putatively secular spaces to rehearse caste practices. The 'casteless' Savarnas deploy cunningly innovative strategies to identify the caste of the 'other', and curate the information to replicate caste relations in modern democratic premises. In reputed engineering institutions such as IITs where surnames (usually a caste denominator in India) may fail to indicate the caste location of an individual, the JEE rank or the selected branch specialisation becomes a proxy for caste identity. Dalit students pursuing postgraduation and doctoral studies from the central universities say that the administration – staffed by the upper castes – tends to identify the caste location based on the scholarships. (Nambissan, G.B. 2012) There have been reports that faculty members in public universities are prejudiced against Dalits, and adopt a patronising attitude, devaluing the abilities of Dalit students by labelling them as 'category/quota walas', referring to their admission through places reserved for them (hence 'category', 'quota') as part of the government's Reservation Policy, thus implying their achievements are undeserved and inferior. (Desai, S. & Kulkarni, V. 2008) Some are outright discriminatory, asking for segregation in seating arrangements. Through derogatory references like 'Sarkari damads' (government sons-in-law), 'Sarkari Brahmins' (government Brahmins – the Hindu upper caste) or 'quota students', educational achievements are undermined and attributed to external factors like affirmative policies, and failures are internalised. Where the support of Dalit professors is available, they too are fighting their own battles, harassed with the threat of revoking their PhDs or being denied promotions.

Conclusion

In conclusion, despite comprising over 16% of India's population, Dalits face multifaceted and deep-rooted barriers to entry and completion of higher education in STEM degrees leading to drastic underrepresentation. Discrimination and hostility on campus negatively impact not only access but also retention and outcomes for Dalits. However, with coordinated efforts spanning policy, institutional leadership, private sector partnerships and public advocacy to enable an equitable playing field, India can nurture diverse Dalit talent in STEM domains critical for nation building. The social, economic and intellectual benefits of such inclusion are immense for the country as a whole.

Recommendations

To guarantee equivalent freedoms for Dalits in STEM (Science, Innovation, Designing, and Arithmetic), proactive measures are fundamental. Drives, for example, grants, mentorship programs, and designated enlistment drives can expand Dalit portrayal. Carrying out enemy-of-separation strategies in instructive organizations and working environments is critical. Also, advancing mindfulness and testing station inclinations through coaching in racial awareness and comprehensive educational program advancement can cultivate a fair climate. Giving admittance to assets, ability-building studios, and systems administration open doors can enable Dalit understudies and experts in STEM fields. At last, developing a comprehensive culture that values variety and meritocracy is essential for acknowledging equivalent freedoms for Dalits in STEM.

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