

JOURNAL

ISSN 0975-0797

**Journal of
Education
&
Pedagogy**

A Peer Reviewed Refereed International Research Journal

Volume XVIII

No.1

June 2026



NATIONAL EDUCATIONIST COUNCIL

(A Vision to be Transformed into Reality to Meet out Global Challenges in the Field of Education)

Website: www.nec-india.org

ISSN 0975-0797

JOURNAL OF EDUCATION & PEDAGOGY



(A Peer Reviewed Refereed International Research Journal)

*Impact Factor: 5.961

Volume-XVIII, No. 1, June 2026

Published Biannually

By National Educationist Council

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Printed by:
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ISSN 0975-0797

JOURNAL OF EDUCATION & PEDAGOGY

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- To abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
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- To uphold and protect the sovereignty, unity and integrity of India;
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- To promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;
- To value and preserve the rich heritage of our composite culture;
- To protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures;
- To develop the scientific temper, humanism and the spirit of inquiry and reform;
- To safeguard public property and to abjure violence;
- To strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavor and achievement.

Peer Conflict, Mediation and Emotional Intelligence: Towards a Peaceful Academic Environment

Pratheesh P.*

ABSTRACT

Peer conflicts are a common occurrence in school life and can significantly impact students' emotional well-being and academic performance. These conflicts may arise from misunderstandings, differences in opinion, competition, or even bullying. Effective management and resolution of such conflicts are essential for sustaining a positive and peaceful school environment. This article explores how emotional intelligence functions as a mediating factor in reducing peer conflicts by strengthening the effectiveness of peer mediation and conflict resolution strategies at the secondary school level. It emphasises the role of teachers and peer mediators in nurturing an emotionally intelligent school culture through targeted training interventions and supportive practices. The article also discusses how emotional intelligence fosters empathy, self-regulation, and social awareness, thereby enhancing the success of peer mediation in resolving conflicts and improving interpersonal relationships. The findings indicate that emotionally intelligent approaches to conflict management reduce disciplinary concerns, improve academic performance, and strengthen the supportive school climate. These insights call for educators and policymakers to prioritise emotional and social learning initiatives that cultivate emotional intelligence as a pathway to building more inclusive, harmonious, and peaceful school environments.

Key words: Emotional Intelligence Training, Peer Mediation, Conflict Resolution, Student Well-being, Academic Performance, Interpersonal Relationships, Holistic Environment

Introduction

Constructive conflict management is a necessary skill for school students to acquire, and many may never acquire it without the right instruction (Johnson & Johnson, 2002). Students are more likely to apply mediation techniques successfully both inside and outside the classroom the more years they spend learning and practicing them. School mediation

is a conflict resolution and peacekeeping procedure that involves a third party's impartial intervention to facilitate an agreement between disputants (Ibarrola-Garcia, 2023). One of the most widely held beliefs is that peer groups control the behaviour of children, sometimes more than parents and teachers particularly the case with teenagers (Kiprono, 2014). Research shows that females are more

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likely to use communication skills and support-validation in conflict resolution tasks, while males are more likely to use physical force or threat (Black, 1994). Wilson et al. (2003) found that all aggressiveness prevention programs positively impact aggressive behaviours, but school mediation programs had inconsistent results due to limited availability. However, Turk's (2018) meta-analysis of 23 studies in Turkey found that conflict-resolution education, peace education, and school mediation significantly improved students' conflict-resolution skills. Similarly, Johnson's (2002) meta-analysis showed that students who learned to mediate conflicts applied these skills in real conflicts even years later.

Cohen (1996), Mashburn and Pianta (2006), Calhoon et al. (2007), Preacher et al. (2007) through their studies states that peer mediation programs are designed to teach students to act as neutral third parties in resolving conflicts among their peers. These programs aim to empower students with the skills to manage conflicts constructively, reducing the need for adult intervention and fostering a culture of mutual respect and cooperation. Integrating emotional intelligence (EI) into peer mediation programs has been shown to enhance conflict resolution skills, improve peer relationships, and reduce bullying and aggression (Sapouna et al. 2009). Research shows that students with higher EI are more effective in resolving conflicts, better managing their emotions, understanding others' emotions, and finding mutually acceptable solutions. Additionally, EI-focused peer mediation programs have been shown to reduce bullying and aggressive behaviours in schools, with students with high EI being less

likely to engage in bullying and more likely to intervene when witnessing incidents (Schoeps et al., 2018).

As a result, creating a healthy school atmosphere is vital for students' overall development, particularly throughout secondary schooling. A helpful and harmonious school environment not only improves academic performance, but also promotes emotional and social well-being in teenagers. In recent years, there has been a deeper recognition of the importance of emotional intelligence in reaching these objectives. Emotional intelligence refers to the 'ability to identify, analyse, and control one's own emotions as well as those of others' (Antonakis & Dietz, 2010). Goleman (1998), Mayer et al. (2000), Mayer et al. (2003), Pekaar et al. (2017), Pratheesh & Zita Francis (2024) and others studies focused on emotional intelligence (EI) and its characteristics, and state it as the capacity to appreciate and accomplish individuals' faculties in this direction. The studies regarding Emotional Intelligence and Conflict Resolution by Goleman, (1995), Jordan and Troth (2002), Hussein (2012), Siskos et al. (2012), Jordan and Troth (2021) have shown that individuals with progressive emotional intelligence are far equipped to knob conflicts effectively.

Despite the recognized importance of emotional intelligence and conflict resolution skills, many schools have yet to fully integrate these strategies into their curricula. As a result, students may lack the necessary tools to manage their emotions and resolve conflicts effectively. This gap in education can lead to increased disciplinary issues, poor academic performance, and a negative school climate.

The research problem, therefore, is to identify and evaluate the impact of emotional intelligence training combined with peer mediation and conflict resolution on creating a positive school environment. The significance of this study lies in its potential to transform the school environment by integrating emotional intelligence training with peer mediation and conflict resolution. By equipping students with these skills, schools can create a more inclusive and supportive atmosphere, which is conducive to learning and personal growth.

Methodology

The study employed a blended-methods approach combining quantitative and qualitative research strategies to evaluate and analyse the impact of emotional intelligence on student's conflict resolution through peer mediation in school setting. The following objectives guided the study.

- * To evaluate secondary school teachers' comprehension of emotional intelligence and its components.
- * To fix the present degree of emotional intelligence among students of secondary school level.
- * To look at the association between students' emotional intelligence and their abilities to effectively mediate conflicts.
- * To assess the effectiveness of peer mediation programs in settling conflicts before and after incorporating emotional intelligence training.

The researcher used a questionnaire (modified) developed by Danial Goleman in 1995 to measure the level of understanding on

emotional intelligence in secondary school teachers. The questionnaire consists of 50 statements covering five factors of EI: self-awareness, managing oneself, managing emotions, empathy, and social skill. The instrument was modified and translated into Malayalam to make it understandable for teachers. The instrument was also used with necessary modifications to measure the emotional intelligence level of secondary school students. The validated and standardisation of the tool is conducted according to the research norms. The researcher modified sentences and sentence positions to match the respondents' levels. Another structured and standardised questionnaire is administered to students participating in peer mediation programs to measure their levels of emotional intelligence, conflict resolution skills, and perceptions of the mediation process. This was also used to assess the changes in these variables in pre and post intervention after the integration of EI training. Descriptive statistics, t-tests, and ANOVA are used to analyse the data and identify significant differences in emotional intelligence and conflict resolution skills before and after the intervention.

For qualitative data, semi-structured interview is conducted with students, teachers, and school counsellors to gain deeper insights into their understanding and impact of emotional intelligence training on peer mediation outcomes. This will focus on participants' experiences, perceived changes in conflict resolution abilities, and overall school climate. The interview also explores shared experiences and collective perceptions of the impact of EI training on student's ability to mediate conflicts effectively.

Results and Analysis

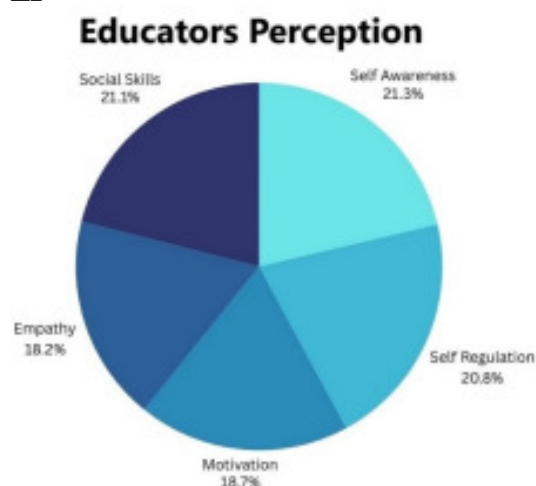
The main purpose of the study, along with the subsequent data collecting and analysis, is to assess secondary school teachers' understanding of emotional intelligence and its components, derived from the following ideal statements.

'Educators, particularly those working with adolescents, should possess a profound understanding of emotional intelligence, as it allows them to regulate their own emotions and effectively support their students. They are dealing with emotions every second, making decisions that are more appropriate and come from a deep place of self-awareness and being present and attuned to the individuals around them. Educators may be in reactionary states, going through the motions, or simply going through the motions. It depends on the mindset that leaders have about emotions. If they believe that emotions matter and that what they're feeling has an impact on their performance and relationships in the classrooms and interpersonal relations, they may be compelled to cultivate a deeper understanding and requisite abilities, as they experience emotions continuously'. (Pratheesh, Zita Francis & Gopakumaran Nair, 2020; Pratheesh & Zita Francis, 2024; Pratheesh, Mary Reema & Zita Francis, 2024)

The first analysis focuses on the educators' conceptual level knowledge regarding emotional intelligence. Participants are given a definition template with conceptual terms shuffled and asked to match the items according to their emotional intelligence comprehension level. According to the participating educators, emotional intelligence is an important feature of students' personal

and social growth during the school day. They defined (agreement score 78%) EI as self-regulation, motivation, self-awareness, empathy, and social skills.

Figure 1: Educators Viewpoint regarding EI



The majority of participating educators (81%) defined self-awareness as recognizing one's emotions, strengths, shortcomings, values, and motivations. 79% acknowledge self-regulation as regulating emotions, impulses, and reactions, and 71% see motivation as driven by a passion for work beyond money or prestige, driven by personal objectives and a sense of purpose as part of emotional intelligence. Empathy (agreement score 69%) as an indicator of emotional intelligence which enable students to understand and sharing others' feelings, demonstrating compassion and concern. Social skills (agreement score 80%) which managing relationships and building networks, effectively communicating, working well in teams, and resolving conflicts constructively as part of emotional intelligence. All of the participants identified these components, with minor differences, as contributing to students' overall well-being and success.

Table-1: Educator' Comprehension of Emotional Intelligence Components

Component	Comprehension Score ($\bar{x}$)	Standard Deviation (σ)
Self-Awareness	4.2	0.6
Self-Regulation	4.0	0.7
Motivation	3.8	0.8
Empathy	4.1	0.5
Social Skills	3.9	0.6

The results indicate that secondary school teachers have a good understanding of emotional intelligence and its components. The mean comprehension scores for self-awareness (4.2), self-regulation (4.0), empathy (4.1), and social skills (3.9) are relatively high, suggesting that teachers are well-informed about these aspects of EI. However, the mean

score for motivation (3.8) is slightly lower, indicating that teachers may have less familiarity with techniques to enhance students' motivation.

For fix the Present degree of emotional intelligence among students, standardized EI assessment was administered to 350 secondary school students.

Table-2: Students' Emotional Intelligence Scores (pre intervention)

Component	Mean EI Score ($\bar{x}$)	Standard Deviation (σ)
Self-Awareness	3.5	0.7
Self-Regulation	3.3	0.8
Motivation	3.2	0.9
Empathy	3.6	0.6
Social Skills	3.4	0.7

The results reveal that the current level (pre intervention level) of emotional intelligence among secondary school students is moderate. The mean EI scores for self-awareness (3.5), empathy (3.6), and social skills (3.4) are relatively higher, indicating that students have a basic understanding of these components. However, the mean scores for self-regulation (3.3) and motivation (3.2) are lower, suggesting that students may need more support in these areas.

Both educators and students agreed that

classroom conflict have negative consequences for progressive learning and social well-being. Students believe that teachers have the primary responsibility to resolve these conflicts while educators agree that empowering students to resolve conflicts peacefully by implementing proactive measures, such as open communication, active listening, empathy building, and problem-solving together. Research findings assure that for fostering a supportive learning environment, teachers can help students feel safe to express themselves and resolve conflicts

amicably (Nazly, 2021). All participants in the study concurred that empathy and comprehension are essential for averting conflict in the classroom. Progressive learning environments encourage students to consider their peers' perspectives, use role-playing activities, and set clear expectations. Open

communication, valuing differences, and other measures also help. Most of the participants value effective communication is crucial, as unresolved conflicts can lead to decreased academic performance, trust erosion, increased anxiety, and loss of interest in learning.

Table-3: Views on Conflict Mediation Abilities

Mediation Skill	Mean Score ($\bar{x}$)	Standard Deviation (σ)
Active Listening	4.0	0.6
Empathy	3.9	0.5
Problem-Solving	3.7	0.7
Negotiation	3.8	0.6

The data on students' conflict mediation abilities, assessed by peers and teachers, provides valuable insights into their strengths and areas for improvement. The mean scores show strong active listening skills, with a high score of 4.0, indicating close attention and understanding of both parties' concerns. Empathy skills are strong, with a mean score of 3.9, indicating understanding and sharing

emotions. Problem-solving skills are moderate, with a mean score of 3.7, indicating room for improvement. Negotiation skills are moderate to good, with a mean score of 3.8, indicating good facilitation and negotiation skills. The data suggests that most students perform well in these areas, with minimal variation in their abilities.

Table 4: Correlation between Emotional Intelligence and Conflict Mediation Abilities

Component	Active Listening (r)	Empathy (r)	Problem-Solving (r)	Negotiation (r)
Self-Awareness	0.65	0.70	0.60	0.63
Self-Regulation	0.60	0.65	0.55	0.60
Motivation	0.55	0.60	0.50	0.55
Empathy	0.70	0.75	0.65	0.70
Social Skills	0.68	0.73	0.63	0.68

The study found strong correlations between students' emotional intelligence and their ability to mediate conflicts. Strong positive correlations with active listening ($r = 0.65$) and empathy ($r = 0.70$) indicate that students with

higher self-awareness are better at understanding and responding to others' emotions during conflict mediation. Strong positive correlations with active listening ($r = 0.60$) and empathy ($r = 0.65$) suggest that

students who can manage their own emotions are more effective at maintaining composure and facilitating productive discussions. Moderate positive correlations with active listening ($r = 0.55$) and empathy ($r = 0.60$) show that motivated students are more engaged and attentive in conflict mediation processes. Very strong positive correlations with active listening ($r = 0.70$) and empathy ($r = 0.75$) highlight the critical role of empathy in understanding and addressing the emotional needs of disputants. Strong positive correlations with active listening ($r = 0.68$) and empathy ($r = 0.73$) indicate that students with strong social skills are more effective at

building rapport and facilitating positive interactions during conflict mediation.

The following part presents the outcomes from the analysis of data (quantitative data) obtained via structured survey distributed to students engaging in peer mediation programs in secondary schools. The analysis focuses on the effect of emotional intelligence training on students' EI levels, conflict resolve skills, and perceptions of the peer mediation process. Quantitative data were collected through pre- and post-intervention surveys, and statistical analyses were conducted to assess the significance of the changes.

Table-5: Combined Analysis- EI Score, Conflict Resolution Skills and Mediation Process

Group	Pre- Intervention Mean ($\bar{x}$)	Pre- Intervention SD (σ)	Post- Intervention Mean ($\bar{x}$)	Post- Intervention SD (σ)
Emotional Intelligence (EI) Scores				
Students	3.1	0.5	4.2	0.6
Mediators	3.4	0.4	4.3	0.5
Conflict Resolution Skills				
Students	3.0	0.6	4.0	0.5
Mediators	3.3	0.5	4.2	0.4
Perceptions of Mediation Process				
Students	2.8	0.7	3.9	0.6
Mediators	3.0	0.6	4.1	0.5

The influence of EI training on students and mediators' emotional intelligence scores shows that the mean for pre-intervention is 3.1, and the mean of post-intervention is 4.2. The pre-intervention SD (σ_{pre}) is 0.4 and the post-intervention SD (σ_{post}) is 0.5.

The analysis of the impact of emotional

intelligence training on conflict resolution skills shows pre-intervention mean 3.0 and the post-intervention mean 4.0. The pre-intervention SD (σ_{pre}) is 0.6 and post intervention is 0.5. It shows that the integration of emotional intelligence training into peer mediation programs significantly enhanced students'

emotional intelligence scores, supporting the hypothesis that EI training can improve the effectiveness of peer mediation programs, leading to better conflict resolution outcomes and a more positive school climate.

The data about perceptions of mediation process shows the mean of pre-intervention is 2.8, mean of post-intervention is 3.9, pre-

intervention SD is 0.7 and the post-intervention SD is 0.6. The mean and standard deviation of the differences were further calculated using normal distribution, assuming that the differences (d) between pre- and post-intervention scores follow a normal distribution. The paired t-test is used to determine the significance of the above data.

Table-6: Paired t-test Results (Combined)

Group	t-value	p-value
Emotional Intelligence		
Students	24.66	0.000
Mediators	24.66	0.000
Conflict Resolution Skills		
Students	27.40	0.000
Mediators	24.66	0.000
Perceptions of the Mediation Process		
Students	30.14	0.000
Mediators	30.14	0.000

The paired t-tests for both students and mediators (emotional intelligence) indicate significant increases in emotional intelligence scores after the intervention ($p < 0.05$). The high t-values (24.66 for both groups) and p-values of 0.000 suggest that the changes in EI scores are statistically significant. This implies that the emotional intelligence training had a positive and significant impact on the participants' emotional intelligence levels.

The results of conflict resolution ($p < 0.05$), t-values 27.40 for students and 24.66 for mediators and p-values of 0.000 suggest that the changes in conflict resolution skills are statistically significant.

The paired t-tests for perceptions of

mediation process of both students and mediators indicate significant improvements in their perceptions of the mediation process after the intervention ($p < 0.05$). The high t-values (30.14 for both groups) and p-values of 0.000 suggest that the changes in perceptions are statistically significant. This implies that the emotional intelligence training had a positive and significant impact on how participants viewed the effectiveness and fairness of the peer mediation process.

The study found significant increases in emotional intelligence scores and conflict resolution skills among students and mediators after the intervention. The training improved participants' ability to resolve conflicts effectively. Additionally, the training positively

influenced participants' perceptions of the mediation process, indicating that the training positively impacted their perception of the effectiveness and fairness of the peer mediation process.

Discussion

Interpreting the results, contrasting them with previous studies, and investigating the ramifications of the findings are the objectives of this study's discussion section. Additionally, this part discusses the study's limitations and offers ideas for future research directions. The quantitative and qualitative analyses provide compelling evidence that the integration of emotional intelligence (EI) training into peer mediation programs significantly enhances students' EI levels, conflict resolution skills, and perceptions of the mediation process.

Secondary school teachers are generally well-informed about emotional intelligence, with high scores for self-awareness, self-regulation, empathy, and social skills. However, their motivation score is slightly lower, suggesting a lack of familiarity with techniques to boost student motivation. Previous studies have shown that teachers' understanding of emotional intelligence is crucial for creating a supportive and emotionally intelligent school environment (Mayer, Salovey, & Caruso, 2000). The high comprehension scores in this study align with the findings of other research that highlights the importance of teacher training in EI (Goleman, 1995).

Regarding student emotional intelligence, the results reveal that the current level of emotional intelligence among secondary school students is moderate. The mean EI scores for self-awareness (3.5), empathy (3.6), and social skills (3.4) are relatively higher, indicating that students have a basic understanding of these

components. However, the mean scores for self-regulation (3.3) and motivation (3.2) are lower, suggesting that students may need more support in these areas. Research has shown that students with higher levels of emotional intelligence are better equipped to manage their emotions, resolve conflicts, and maintain positive relationships (Parker et al., 2004). The moderate EI scores in this study are consistent with previous findings that highlight the need for targeted EI training programs in schools to further enhance students' emotional skills (Zins et al., 2004).

Students with higher self-awareness and self-regulation were better at understanding and responding to others' emotions during conflict mediation. Students who managed their own emotions were more effective in maintaining composure and facilitating productive discussions. Motivated students were more engaged and attentive in conflict mediation processes. Empathy was found to play a critical role in understanding and addressing the emotional needs of disputants. Students with strong social skills were more effective at building rapport and facilitating positive interactions during conflict mediation. The findings demonstrate a clear and significant association between students' emotional intelligence and their abilities to effectively mediate conflicts. Students with higher levels of self-awareness, self-regulation, motivation, empathy, and social skills are better equipped to handle conflicts constructively. These results align with existing research that emphasizes the importance of emotional intelligence in conflict resolution and interpersonal relationships (Mayer, Salovey, & Caruso, 2000; Goleman, 1995).

The statistical analysis demonstrates that the integration of emotional intelligence training

into peer mediation programs significantly enhances students' emotional intelligence scores. The paired t-tests for both students and mediators indicate statistically significant improvements in EI scores, conflict resolution skills, and perceptions of the mediation process ($p < 0.05$). These findings are supported by the qualitative data, which reveal enhanced emotional awareness, improved self-regulation, increased motivation, greater empathy, and better social skills among students. These findings support the hypothesis that emotional intelligence training can improve the effectiveness of peer mediation programs, leading to better conflict resolution outcomes and a more positive school climate. The study provides valuable insights into the potential benefits of emotional intelligence training in enhancing conflict resolution outcomes. The results are unswerving with former research that highlights the positive impact of EI on conflict resolution and overall school climate. Mayer, Salovey, and Caruso (2000) emphasized the role of EI in managing emotions and resolving conflicts effectively. Goleman (1995) also noted that persons with high EI are well prepared to handle interpersonal relationships and conflicts. The current study builds on this body of knowledge by demonstrating that EI training can be effectively mixed into peer mediation initiatives to enhance their effectiveness.

Suggestions

The study and its findings have several important implications for educators, policymakers, and school administrators.

Integration of EI Training into Peer Mediation Programs: Schools should consider incorporating EI training into their existing peer mediation programs. This

approach can empower students with the skills necessary to manage their emotions, empathize with others, and resolve conflicts constructively.

Professional Development for Educators: Teachers and school counsellors should receive training in EI to better support students in developing these critical skills. This professional development can include workshops, seminars, and ongoing support.

Policy Recommendations: Policymakers should advocate for the inclusion of EI training in school curricula and provide funding and resources to support these initiatives. This can help create a more inclusive and supportive school environment

The study has certain limitations, including its specific educational context, short-term focus on emotional intelligence training, and potential bias in self-reported data. It suggests that future research should consider diverse educational settings and use multiple data sources to validate the findings. Additionally, it emphasizes the need for long-term studies to evaluate the long-term effect of EI training on students' emotional growth, academic performance, and social interactions. The study suggests impending research, including longitudinal studies to weigh the far-reaching impact of EI training on students' emotional growth, diverse populations to validate findings, exploring mechanisms of change to enhance conflict resolution skills and improve school climate, and integrating EI training with other school-wide initiatives like social-emotional learning (SEL) programs to create a supportive school environment.

Conclusion

The study highlights the importance of emotional intelligence (EI) in enhancing

students' conflict mediation abilities. By developing EI components, students can become more effective mediators, leading to better conflict resolution outcomes and a more positive school environment. It also provides the level of comprehension of emotional intelligence among secondary school teachers and the current level of EI among students. Teachers demonstrate a good understanding of EI components, with slightly lower familiarity with motivation techniques. Students exhibit moderate levels of emotional intelligence, with higher scores in self-awareness, empathy, and social skills, but lower scores in self-regulation and motivation. The paired t-tests for both students and mediators

indicate statistically significant improvements in EI scores, conflict resolution skills, and perceptions of the mediation process ($p < 0.05$). These findings are supported by the qualitative data, which reveal enhanced emotional awareness, improved self-regulation, increased motivation, greater empathy, and better social skills among students. The implications of these findings are significant for educators, policymakers, and school administrators, who can use this evidence to inform the development and implementation of EI training in schools. Future studies should address the shortcomings of this study and discover the far-reaching effect and mechanisms of transformation associated with EI training.

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Prevalence of Sofalization among Higher Education Students with Different Personality Traits

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ABSTRACT

Sofalization emerged during the COVID-19 era, a period in which humans became increasingly comfortable with online interaction. The term "sofalization" is derived from the words sofa and socialization, referring to a phenomenon in which individuals remain within their comfort zones while engaging in social interactions through online environments. At the same time, sofalization has influenced various personality traits, including neuroticism, openness to experience, conscientiousness, agreeableness, and introversion. To assess these personality traits, a standardized tool developed by Rammstedt and John (2007), namely the Big Five Inventory (BFI), was used. Additionally, sofalization was measured using a scale developed by Tosunta?, Karada?, Emirtekin, Kircaburun, and Griffiths (2020). The study was conducted at the Central University of South Bihar (CUSB), where a total of 578 participants took part in the research. While selecting the sample, due consideration was given to the levels of various courses, discipline and gender (female/male). The present research study attempts to examine the status of 'socialization' among students in higher education, and how it is influenced by their gender, subject of study, type of course, and personality. The findings of this research reveal that the prevalence of 'socialization' within universities is gradually increasing, suggesting that students are utilizing digital platforms for social engagement. While digital platforms-or social media-offer immediate avenues for communication, they simultaneously tend to diminish the inclination toward face-to-face interaction and emotional connection with others; this undoubtedly constitutes a matter of concern regarding the social well-being and academic equilibrium of students.

Key words: Sofalization, Personality traits, Introversion, Openness to experience, Conscientiousness, Agreeableness

Introduction

'Sofalization' essentially emerged during the era of the COVID-19 pandemic, when lockdowns prevented people from stepping out

of their homes, compelling them to utilize online platforms for all manner of activities-whether related to education or employment. Initially, 'Sofalization' served merely as an auxiliary tool; however, as times evolved, the youth

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progressively increased their reliance upon it—a trend that has now given rise to issues such as 'digital health' concerns. 'Sofalization' facilitates a form of pseudo-socialization; consequently, people are losing interest in interacting with their immediate neighbors and are increasingly falling victim to loneliness—a phenomenon that constitutes a matter of significant social concern.

This concept has gained significance recently, mainly due to the rise of digital technologies and virtual communication platforms that offer numerous opportunities for social engagement without the need for in-person interaction. In the upcoming study, the researcher aims to delve into the dynamics of sofalization and its correlation with diverse personality traits.

Sofalization is a multifaceted phenomenon influenced by various factors, including excessive engagement with social media and a growing preference for virtual communication over face-to-face interactions. Internet platforms are highly appealing due to their ease of use, accessibility, and ability to connect people across geographical boundaries. However, this convenience can also lead to an overreliance on virtual communication, reducing opportunities for meaningful in-person interactions. Social media platforms have gained immense global popularity, captivating millions of users for leisure activities. Nearly two-thirds of the world's population actively engages with social media (Wong, 2023). Despite the numerous advantages, research indicates that a small percentage of users require assistance due to excessive usage (Kuss & Griffiths, 2017). An intense fixation on social media, a strong urge to use it, and extended use of these platforms are characteristics of social media addiction

(SMA), a severe consequence. SMA can lead to social, personal, and professional constraints and reduced psychological well-being (Andreassen & Pallesen, 2014). Extensive research has uncovered the adverse effects of SMA, including psychological distress, strained relationships, physical health issues, and decreased productivity (Andreassen, 2015). Consequently, scientists have focused on identifying predictive factors for SMA to develop effective prevention and intervention strategies. 'Sofalizing' was coined to describe the preference for engaging in online social interactions. This term merges "sofa" and "socialising," emphasising the use of the internet or electronic devices for social interactions from the comfort of one's home. It encompasses various forms of online communication, such as texting, emailing, social media messaging, status updates, and tweets, replacing traditional face-to-face interactions (Collins Dictionary, 2019). This trend has seen a noticeable increase, with more people opting to interact online rather than meet in person (Realwire, 2010). Several factors contribute to this shift, including the need for convenience, the preference for a more relaxed approach, tendencies to multitask, time constraints, the expenses associated with going out, and a desire to avoid lengthy conversations (Macmillan Dictionary, 2019).

Personality traits are essential in influencing individuals' inclination towards Sofalization. Several important personality traits are often linked to this phenomenon. Some of them are discussed below (Tosuntas, Karadag & Boz, 2020).

"For introverts, sofalizing online offers a comfortable environment for connecting with others without the demands of face-to-face

communication. Some may find it easier to express their thoughts and opinions online, engage in meaningful discussions, and connect with like-minded individuals." Tosunta? et al. (2020). Sofalization may offer neurotic individuals a feeling of control and safety, but it can also amplify their tendency to dwell on negative thoughts. Ongoing exposure to online content, including news and social media, has the potential to heighten feelings of anxiety and emotional distress (Kuss & Griffiths, 2017). Openness to Experience Individuals characterised by high levels of Openness often thrive in environments that foster their inquisitiveness and creativity. (Andreassen, 2015).

Engaging in sofalization allows for exploring diverse perspectives, engaging art, culture, and knowledge from various global regions, and supporting cognitive development. Conscientiousness Conscientious individuals may partake in sofalization with a methodical approach, leveraging digital technologies to optimize efficiency, promote collaboration, and engage in purpose-driven endeavours. However, they may face challenges such as information overload, distractions, and the need to delineate clear boundaries between work and leisure. (Andreassen & Pallesen, 2014)"Sofalization can help friendly individuals build positive relationships, offer help, and have meaningful conversations. They can use online platforms to connect with others, volunteer, and work towards building a community that aligns with their values and vision for social unity."

Sofalizing is a term that comes from the combination of words sofa and socializing and refers to the use of the internet or other electronic devices (e.g. texting mail, social media messaging status updates, tweets) for socializing with individuals from home rather

than in person (collins dictionary ,2019). In this study, 'sofalizing' was measured using the 'Sofalizing Scale' developed by Tosunta? et al. (2020), wherein, instead of engaging in face-to-face interaction, an individual establishes communication with others through the aid of digital platforms while remaining within their own private space/home

Rationale of the study

Due to the use of digital platforms in day-to-day educational and social life, a noticeable shift is becoming apparent in the way students communicate and form social relationships. During the COVID-19 pandemic, the increasing reliance on digital platforms-across both academic and professional spheres-has led to a rise in privatization. People are demonstrating a growing preference for "sofalization"-that is, communicating through digital mediums-rather than engaging in face-to-face interaction. While digital platforms undoubtedly offer the opportunity to connect with people across the globe in a short span of time and from a single location, they simultaneously create a distance from those physically present in one's immediate environment; this, in turn, is contributing to an increase in issues such as loneliness and discomfort regarding direct interpersonal communication.

Despite the ever-increasing need for 'sofalization,' research on this subject within the realm of higher education remains extremely limited to this day, particularly within the Indian context. Existing studies have primarily focused on related issues such as social media addiction, phubbing, and online learning readiness, but few have directly investigated sofalization as a distinct behavioural pattern. Moreover, personality

traits-conceptualized through the Big Five model-are known to influence social behaviour, coping mechanisms, and preferences for digital or face-to-face engagement. For example, students high in neuroticism or introversion may gravitate towards digital platforms as a safer, less demanding mode of interaction, whereas extroverted and conscientious individuals may actively resist sofalization.

This gap in the literature highlights the need to explore how personality differences shape sofalization tendencies among students. Such an investigation is essential not only for advancing theoretical understanding but also for addressing practical concerns in higher education. Insights from this study can help institutions design targeted interventions-such as counselling services, digital wellness initiatives, and blended learning practices-that support healthier patterns of engagement. By linking personality traits with digital behaviour, the present research aims to provide a nuanced understanding of student well-being in a digitally saturated environment, thereby contributing to both academic scholarship and educational policy.

Objectives

The following objectives of the study were framed:

1. To assess the level of sofalization among higher education students based on gender.
2. To assess the level of sofalization among higher education students based on discipline.
3. To assess the level of sofalization among higher education students based on course level.

Hypotheses

To achieve the objectives of the study, the following hypotheses were formulated:

1. There is a significant difference in the level of sofalization among higher education students based on gender.
2. There is a significant difference in the level of sofalization among Higher education students based on discipline.
3. There is significant difference in the level of sofalization among higher education students based on the level of course.

Methods

Research Design

This study employed a quantitative survey design to investigate the prevalence of sofalization among higher education students and to examine differences in sofalization behaviour across gender, course level, academic discipline, and personality traits. The design was selected because it allowed for systematic data collection and statistical analysis of relationships between variables in a relatively large student population.

Population and Sample

The population of the study comprised students enrolled in higher education programmes at the Central University of South Bihar, Gaya. Owing to time and feasibility constraints, the scope of the study was limited to this institution. A purposive sampling technique was employed to select participants from diverse disciplines and levels of study. The sample included both male and female students, ensuring representation from undergraduate, postgraduate, and professional programmes.

Variables

The study considered two major sets of variables:

Independent variables: gender, academic discipline, course level, and personality traits.

Dependent variable: level of sofalization.

Tools and Instruments

Two standardized instruments were used for data collection:

1. Sofalization Scale (Tosunta? et al., 2020) - To measure the extent of students' face-to-face interactions instead of preference for online socializing.
2. Big Five Inventory-10 (BFI-10; Rammstedt & John, 2007) - To assess traits associated with the five dimensions of personality:
 1. Extraversion
 2. Agreeableness
 3. Conscientiousness
 4. Neuroticism
 5. Openness to Experience.

The reliability and validity of both tools were established, and they have been widely utilized in practical and educational research, thereby ensuring reliability in the measurement of the concepts under investigation.

Procedure of Data Collection

To collect the data, participants were first provided with necessary information regarding the data collection process, and assurances were given regarding their privacy and confidentiality. Subsequently, with their consent, the research instrument was administered to collect the data. A structured questionnaire was utilized for data collection

in the present study. Following data collection, the researcher verified the accuracy and completeness of the responses.

Data Analysis

The data were analysed using both descriptive and inferential statistical techniques. Descriptive statistics, including mean and standard deviation, were used to summarise the overall levels of sofalization. Inferential statistics such as t-tests and one-way ANOVA were applied to examine differences in sofalization scores based on gender, academic discipline, and course level. Additionally, ANOVA with post-hoc analysis was used to assess variations across different personality traits. The analysis was conducted using appropriate statistical software.

H01: There will be no significant difference in the level of sofalization among higher education students based on gender. Table1. Group Descriptive of sofalization scores among male and female students Group.

Table-1:

	Sofalization
N	575
Mean	31.8
Median	32.0
Mode	33.0
Standard deviation	6.45
Range	44
Minimum	11
Maximum	55
Skewness	0.0582
Std. error skewness	0.102
Kurtosis	0.167
Std. error kurtosis	0.203
Shapiro-Wilk W	0.995
Shapiro-Wilk p	0.082

Prevalence of Sofalization among Higher Education Students with Different Personality Traits

The above table shows that mean and median values of female and male students are closer to each other, no such discrepancy between these values was seen. 43 The

Prevalence of Sofalization Among Higher Education Students with Different Personality Traits Assumption Check Table 2.

Table-2: Group Descriptive

	Group	N	M	Mdn	SD	SE
Sofalization	Female	304	31.4	31.5	6.31	0.362
	Male	272	32.3	32.0	6.59	0.399

Normality Test (Shapiro-Wilk) of Sofalization scores when comparing by gender W p Total of Sofalization 0.996 0.136 The Shapiro-Wilk test was used to assess whether a dataset follows a normal distribution or not.

Since the p-value (0.136) is greater than 0.05, there is no strong evidence to suggest a violation of normality. This means the data likely follows a normal distribution, and thus can proceed with analyses that assume normality.

Table 3: Homogeneity of Variances Test (Levene's)

	F	df	df2	p
Sofalization	0.00472	1	574	0.945

Levene's test was conducted to examine the assumption of homogeneity of variances across groups. The obtained p-value (0.945) is substantially greater than the threshold of 0.05, indicating no significant violation of this assumption. Therefore, the variances can be

considered equal. Based on this result and the overall distribution of the data, it is appropriate to proceed with parametric statistical tests.

Traits 45 Independent t test Table 4. Independent Samples t-Test of Sofalization based on Gender Statistic df p Sofalization

Table-4: Independent Samplest-Test of Sofalization basedon Gender

		Statistic	df	p
Sofalization	Student'st	-1.59	574	0.113

The independent samples t-test was conducted to examine differences in sofalization scores based on gender. The results indicate a t-value of 1.59 with a p-value of 0.113, which is greater than the significance level of 0.05. This suggests that there is no statistically significant difference between male

and female students. Therefore, the null hypothesis cannot be rejected. It can be concluded that gender does not have a significant effect on sofalization scores within the present sample.

H02: There is no significant difference in the level of sofalization among Higher education students based on discipline.

Table-5: Group Descriptive of Sofalization scores by academic disciplines

	Discipline	N	Mean	SD	SE
Sofalization	Education	185	31.7	6.44	0.473
	Science	166	32.3	6.48	0.503
	Law	81	30.6	6.60	0.733
	Social science	89	31.8	5.77	0.612
	Others	55	32.4	7.17	0.967

The above table shows that mean values of education, law, science, social science and others are closer to each other; no such discrepancy between these values was seen.

Table-6: Normality Test (Shapiro-Wilk) of Sofalization scores when comparing by academic disciplines

	W	P
Total of Sofalization	0.996	0.133

An examination of the table above clearly indicates that the p-value for the Normality Test (Shapiro-Wilk) of the Sofalization scores is 0.133, and the W-value is 0.996. When assessed at the 0.05 significance level, it is evident that the p-value exceeds 0.05; on this basis, it can be concluded that the data follows a normal distribution. The Normality Test (Shapiro-Wilk) was employed to determine whether or not the Sofalization scores adhered to a normal distribution.

Table -7 One-Way ANOVA (Fisher's)

	F	df1	df2	P
Total of Sofalization	1.11	4	571	0.350

Levene's test assesses whether the variances are equal across groups. Since the p value (0.133) is much greater than 0.05, there is no evidence to suggest a violation of homogeneity of variances. This means we can proceed with statistical tests that assume equal variance. Based on the data distribution and assumption check result, we can assume our data is fit for parametric test.

The table displays the results of the one-way ANOVA conducted to compare the sofalization scores based on discipline. The statistics represent the F value -1.10, with p value of 0.350 (>0.05) indicates no significant difference among the different disciplines. so, there is insufficient evidence to reject the null hypotheses. This suggests that there is no statistically significant difference in sofalization scores among sciences, social sciences, Education, and Law disciplines in this sample. There will be no significant difference in the level of sofalization among higher education students based on the level of courses.

The Shapiro-Wilk test was used to assess whether a dataset follows a normal distribution or not. Since the p-value (0.350) is greater than 0.05, there is no strong evidence to suggest a violation of normality. This means the data likely

follows a normal distribution, and thus can proceed with analyses that assume normality.

H03: There will be no significant difference

in the level of sofalization among higher education students based on the level of courses.

Table-8: Group Descriptives

	Level of course	N	Mean	SD	SE
Total of Sofalization	Research	75	32.0	6.05	0.699
	Post - graduate	281	32.1	6.02	0.359
	Undergraduate	220	31.4	7.09	0.478

The data derived from this study clearly indicate that there is no significant difference in socialization based on variations in academic discipline or educational level. While socialization is widely prevalent within the realm of higher education, it transcends the boundaries of specific subjects or educational stages. This research further clarifies that online mediums for social interaction are not utilized exclusively by students in higher education; rather, they are also employed by students at other educational levels who possess the necessary tools to access and utilize these online platforms.

In the present study, Levene's test was employed to assess the variance across various groups. An examination of the aforementioned table reveals that the p-value is 0.0130, which is greater than 0.05; based on this finding, it can be concluded that there is homogeneity of variance. The distribution of the data satisfies the assumptions of parametric statistics; therefore, it is suitable for the application of parametric tests.

Thus, we have considered Fisher's F test for examining significant difference among the students of under-graduation, post-graduation, and research scholars.

The table displays the results of the one-way ANOVA conducted to compare the sofalization scores based on discipline. The statistics represent the F value -1.10, with p value of 0.501 (>0.05) indicates no significant difference among the different disciplines. so, there is insufficient evidence to reject the null hypotheses. This makes it evident that there is no significant statistical difference in socialization across the disciplines of Science, Social Sciences, Education, and Law.

Given the increasing prevalence of socialization in the contemporary era, Higher Education Institutions (HEIs) must also focus on the appropriate and balanced utilization of technology. The NEP 2020 places comprehensive emphasis on the social, cultural, ethical, and emotional development of the learner. Relying on virtual mediums for connection or communication may limit opportunities for face-to-face interaction-a core component emphasized by the NEP 2020.

In the context of higher education, these findings underscore the need for a purposeful design wherein HEIs and universities provide equal opportunities for both online and in-person interaction. The blended learning approach outlined in the NEP 2020 is currently observed

at the university level; however, it should be extended to other educational levels as well to help counterbalance excessive reliance on virtual mediums.

Furthermore, the lack of significant differences across levels of study suggests that sofalization is not necessarily mitigated by academic maturity. Even researchers-who are expected to engage in more in-depth and independent work-exhibit this same attitude. This highlights the need for a conscious integration of digital well-being, technology, and self-reflection within the curriculum of higher education.

Conclusion

The present research study endeavors to examine the prevalence of 'Socialization' among students in higher education, specifically analyzing how this phenomenon varies based on their gender, academic discipline, and level of study. The findings clearly indicate that 'Socialization' is currently widespread within the higher education landscape, and there are no significant differences in its usage based on gender, educational level, or academic discipline. This suggests that, at present, students do not perceive any specific deficits arising from their engagement through 'Socialization'; nevertheless, there remains a definite need to guard against its excessive use.

While the National Education Policy (NEP) 2020 advocates for the promotion of digital literacy, the findings of this study underscore that while digital mediums are indeed essential, their utilization must be approached with a specific focus on appropriate and balanced usage-one that safeguards the best interests of the students. Within the realm of higher education,

'Socialization' should be leveraged as a student-centric pedagogical tool, thereby providing students with a multitude of learning opportunities.

When gender differences were examined, the independent t-test showed no statistically significant difference in sofalization scores between male and female students ($t = -1.59$, $p = 0.113$). Similarly, the one-way ANOVA conducted to assess the difference in sofalization across academic disciplines (Education, Law, Science, Social Science, and Others) yielded no significant results ($F = 1.11$, $p = 0.350$), suggesting uniformity in sofalization behavior across fields of study. There is no significant difference was found in the impact of course levels-specifically at the undergraduate, postgraduate, and research scholar stages ($F = 0.747$, $p = 0.474$)-leading to the conclusion that educational level does not have any substantial effect on socialization trends.

Personality traits play a pivotal role in shaping socialization patterns. Students with introverted personalities feel more comfortable communicating through online mediums; conversely, individuals with extroverted personalities prioritize sociability and face-to-face interaction. No significant differences were observed based on gender regarding the interplay between socialization and personality traits among students; however, variations were evident among students pursuing different courses and subjects.

This study shows that digital well beingness and social awareness is more important in the higher organization. So, that individuals get less affected.

Overall, the study underscores the importance of addressing sofalization within

higher education. Institutions must acknowledge its psychological and social implications by integrating digital wellness initiatives, counselling support, and blended learning practices into their academic frameworks. The utilization of digital media opens up avenues that not only support a solitary lifestyle but also provide introverted individuals with opportunities to connect socially. Through these mediums, university students gain opportunities to learn and engage with their peers; this not only fosters strong

relationships and emotional bonds but also provides a robust platform for the sharing of knowledge and information.

Therefore, in conclusion, it can be stated that this study highlights the emerging relevance and necessity of 'socialization' within the realm of higher education. Furthermore, it suggests that extensive research be conducted on the subject of 'socialization' in the future, thereby facilitating the development of a clear understanding regarding both its significance and its appropriate and balanced application.

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Evaluating the Efficacy of Short-term Geo-Literacy Training for Capacity Building in India: An Evaluation Study for Healthcare and Public Health Management

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ABSTRACT

Geo-literacy, encompassing the understanding and application of Geographic Information Systems (GIS), is increasingly vital for informed decision-making in public health and sustainable development. This study evaluated the effectiveness of a 21-day winter school GIS training program conducted in Mysuru, India, aimed at enhancing geo-literacy among multidisciplinary participants (n = 24). The program integrated theoretical instruction, hands-on GIS training, and field-based learning to provide a comprehensive and experiential learning environment. A pre- and post-test design using standardized assessments was employed to measure knowledge gains across foundational, applied, and theoretical domains of GIS. Statistical analyses, including paired t-tests and subgroup comparisons, were conducted to evaluate learning outcomes. The results demonstrated a statistically significant improvement in overall scores, with mean values increasing from 19.00 to 21.74 ($p < 0.001$), along with notable gains across all domains, including basic GIS and remote sensing concepts, application and integration, and theoretical knowledge. Subgroup analysis indicated that females, older participants, and those without prior GIS experience exhibited relatively greater improvements. Additionally, structured evaluations through MCQ tests, practical examinations, and mini projects confirmed enhanced conceptual understanding and technical competencies. Participant feedback reflected high levels of satisfaction, particularly with the experiential and application-oriented components of the training. These findings highlight the effectiveness of short-term, intensive GIS training programs in improving geo-literacy across diverse learner groups. However, limitations such as the absence of standardized assessment tools and lack of long-term follow-up warrant further investigation. Future research should focus on assessing knowledge retention and practical application to enhance the scalability and impact of such capacity-building initiatives.

Key words: Geo-literacy; GIS training; Public health; Capacity building; Geospatial technology; Spatial analysis

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Introduction

Geospatial Science and Technology, encompassing Geographic Information Systems (GIS), Remote Sensing (RS), and Global Positioning Systems (GPS), has become an indispensable component of modern public health and healthcare management. These technologies facilitate the visualization, analysis, and interpretation of spatial data, enabling a deeper understanding of disease distribution, environmental exposures, and healthcare accessibility. Recent global evidence highlights the growing integration of geospatial tools in public health systems, particularly for disease surveillance, outbreak management, and resource allocation (Haisoufi & Bouaiti, 2024; Qwaider et al., 2023). International organizations such as the World Health Organization (WHO) extensively utilize GIS to analyze disease patterns, guide interventions, and monitor progress toward health-related Sustainable Development Goals (SDGs), many of which rely on geospatial data for effective implementation (Avtar et al., 2019).

Despite these advancements, a substantial gap in geo-literacy persists, particularly among healthcare professionals, largely due to the limited integration of spatial thinking and applied GIS training within traditional curricula. The geospatial domain has witnessed rapid growth across sectors including public health, agriculture, urban planning, and disaster management; however, its potential remains underutilized in countries like India due to insufficient technical capacity and awareness (Dritsas & Trigka, 2025).

Enhancing geo-literacy is therefore essential for empowering professionals and decision-makers to effectively utilize spatial data for evidence-based decision-making and sustainable development (Nagavi et al., 2024).

At the national level, India has introduced the National Geospatial Policy (NGP) 2022, which aims to strengthen geospatial infrastructure, promote skill development, and foster innovation ecosystems to support economic growth and sectoral advancements, including healthcare (Kamaraj, 2026). The policy underscores the importance of building human resource capacity to leverage geospatial technologies for improved service delivery and public health management. India's geospatial economy is projected to grow significantly, contributing to employment generation and supporting critical sectors such as healthcare (AGI India, 2026).

Contemporary research emphasizes that experiential, problem-based, and project-oriented learning approaches are critical for developing GIS competencies and professional readiness (Thapa et al., 2019). In this context, short-term intensive training programs have emerged as effective strategies for rapid capacity building by imparting both foundational knowledge and practical skills. The importance of geo-literacy in healthcare lies in its ability to transform disease surveillance, health service delivery, and policy planning through precise spatial analyses such as disease modeling, accessibility mapping, and resource optimization (Li et al., 2025; Vine et al., 2023). Furthermore, geospatial technologies play a vital role in achieving health-related SDGs by

strengthening monitoring frameworks and enabling data-driven interventions (Sourd & Ricker, 2025).

In this context, the present study evaluates the effectiveness of a 21-day winter school training program designed to enhance geo-literacy among participants from diverse academic and professional backgrounds in India. By assessing the outcomes of this short-term training intervention, the study aims to contribute to the growing body of evidence on geospatial capacity building and inform future policy and educational strategies for strengthening geospatial competencies in public health.

Methods

Study Design

This study employed a training evaluation design using a pre-test and post-test approach to assess the effectiveness of a short-term geospatial training program in improving geo-literacy. The design enabled a quantitative comparison of participants' knowledge before and after the intervention (Turner & Leydon, 2012).

Study Setting and Participants

The training program was conducted at JSS Academy of Higher Education and Research, Mysuru, over a period of 21 days (27th November-17th December 2024). A total of 24 participants completed the program, although 25 were initially registered. The participants represented diverse professional backgrounds, including medicine, public health, engineering, and geospatial sciences. The majority were external participants, reflecting

a heterogeneous learning cohort with varying levels of prior GIS exposure.

Training Program Structure

The program followed a blended instructional approach, integrating theoretical sessions, hands-on training, and field-based learning. The theoretical component covered fundamental concepts of Geographic Information Systems (GIS), Remote Sensing (RS), and Global Positioning Systems (GPS). Practical sessions were conducted using open-source GIS software such as QGIS and SAGA GIS to develop technical competencies. Field-based learning involved real-time data collection using GPS devices and mobile applications such as Kobo Toolbox, enabling participants to engage with real-world spatial datasets.

Instructional Content

The curriculum encompassed a comprehensive range of topics, including spatial and non-spatial data integration, image digitization, interpolation techniques such as inverse distance weighting, spatial statistical tools including heatmaps and centroid analysis, and applications of GIS in achieving Sustainable Development Goals. The training also incorporated case studies and expert lectures delivered through both in-person and online modes to enhance applied learning.

Assessment and Evaluation

Participant performance was evaluated using a structured framework comprising multiple components. A multiple-choice question (MCQ) test assessed theoretical knowledge, while a practical examination

evaluated technical GIS skills. Mini-projects were used to assess the application of geospatial concepts to real-world problems, and participation-based scoring accounted for engagement and attendance. The total evaluation was conducted for 100 marks.

Data Collection and Analysis

Data were collected through pre-test and post-test assessments measuring overall knowledge and domain-specific competencies (Huynh & Sharpe, 2013). Statistical analysis was performed using paired t-tests to compare mean scores before and after the training, with statistical significance set at an appropriate level. Additionally, demographic variables such as gender, age, education, and prior GIS experience were analyzed to examine their influence on learning outcomes (Keles et al., 2025).

Quality Assurance Measures

Continuous feedback mechanisms and remedial sessions were implemented throughout the training to address learning gaps and ensure inclusive participation. This approach enhanced the effectiveness of the program and supported participants with varying levels of prior knowledge.

Results

The results of the training program

indicate a substantial improvement in participants' geo-literacy and technical competencies following the 21-day intervention. Participants demonstrated enhanced understanding of geospatial concepts and were able to effectively apply GIS tools for spatial analysis and visualization. The hands-on sessions played a critical role in skill development, enabling participants to create maps, analyze spatial data, and interpret results within public health contexts. All participants successfully completed mini projects addressing real-world healthcare challenges, including disease outbreak mapping, child health and nutrition analysis, vaccine coverage assessment, and environmental suitability analysis for landfill sites, thereby highlighting the practical applicability of geospatial technologies.

Quantitative analysis revealed statistically significant improvements in knowledge scores. Based on a sample size of 24 participants, the overall mean score increased from 19.00 (± 2.92) in the pre-test to 21.74 (± 2.07) in the post-test ($p < 0.001$), indicating a significant enhancement in geo-literacy following the training intervention (Meechandee & Meekaew, 2025). The distribution of pre- and post-test scores is illustrated in Figure 1, demonstrating a clear upward shift in performance.

Table-1: Comparison between Pre and post test scores of Training Program

	Pre-test Mean (SD)	Post-test Mean (SD)	P-value
Scores	19 $\pm$ 2.92	21.74 $\pm$ 2.07	<0.001

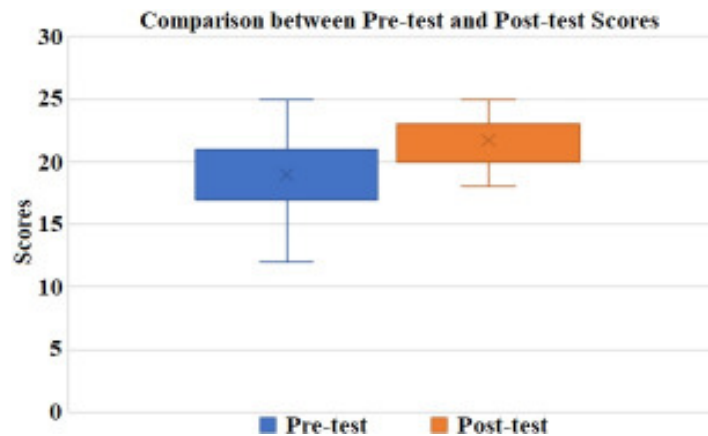


Figure-1: Box plot representing the distribution of pre-test and post-test scores

Table-2: Comparison of Pre-test and Post-test Scores Across Knowledge Domains

Domains	Pre-test Mean (SD)	Post-test Mean (SD)	P-value
Basic Concepts of GIS & Remote sensing	11.09±1.37	12.43±1.12	<0.001
Application & Integration of GIS	4.78±1.47	6.65±1.19	<0.001
Theoretical & Historical Knowledge of GIS	2.3±0.76	2.65±0.48	0.043

Domain-specific analysis further substantiated these findings. The Basic Concepts of GIS and Remote Sensing domain showed a significant increase in mean scores from 11.09 (± 1.37) to 12.43 (± 1.12) ($p < 0.001$), reflecting improved understanding of core geospatial principles. Similarly, the Application and Integration domain exhibited a notable rise

from 4.78 (± 1.47) to 6.65 (± 1.19) ($p < 0.001$), indicating enhanced proficiency in GIS software utilization and spatial data analysis. The Theoretical and Historical Knowledge domain also demonstrated a statistically significant increase from 2.30 (± 0.76) to 2.65 (± 0.48) ($p = 0.043$), suggesting improved comprehension of conceptual and interdisciplinary aspects of GIS.

Table 3. Comparison of Pre-test and Post-test Scores Among Participants by Demographic and Educational Characteristics

Variable	Category	Pre-test Mean (SD)	Post-test Mean (SD)	P-value
Gender	Male	19.22 $\pm$ 1.2	21.33 $\pm$ 2.34	0.045
	Female	18.86 $\pm$ 3.6	22 $\pm$ 1.9	0.011
Age	Below 30	19.13 $\pm$ 3.64	21.50 $\pm$ 2	0.115
	Above 30	18.93 $\pm$ 2.6	21.87 $\pm$ 2.16	0.001
Education	Medical	19.4 $\pm$ 2.4	23.4 $\pm$ 1.1	0.025
	Non - medical	18.8 $\pm$ 3.1	21.28 $\pm$ 2.05	0.006
GIS background	Yes	19 $\pm$ 2	21.38 $\pm$ 2.1	0.006
	No	19 $\pm$ 4.5	22.57 $\pm$ 1.6	0.038

Demographic analysis revealed differential learning gains among participants. Female participants achieved higher post-test mean scores (22.00 ± 1.9) compared to males (21.33 ± 2.34), with both groups showing statistically significant improvements. Age-based analysis indicated that participants above 30 years exhibited significant gains ($p = 0.001$), whereas those below 30 years did not show statistically significant improvement ($p = 0.115$). Educational background also influenced outcomes, with participants from medical disciplines demonstrating greater improvement (19.4 ± 2.4 to 23.4 ± 1.1 , $p = 0.025$) compared to non-medical participants (18.8 ± 3.1 to 21.28 ± 2.05 , $p = 0.006$). Furthermore, participants without prior GIS experience exhibited greater relative improvement (19.0 ± 4.5 to 22.57 ± 1.6 , $p = 0.038$) compared to those with prior exposure (19.0 ± 2.0 to 21.38 ± 2.1 , $p = 0.006$).

In addition to quantitative outcomes, participant feedback indicated high levels of satisfaction with the training program. Participants appreciated the relevance of the content, expertise of instructors, clarity of teaching, and strong emphasis on practical applications. The interactive and experiential learning approach was particularly valued for promoting active engagement and deeper understanding. However, some participants reported challenges related to varying levels of prior knowledge, which affected the pace of learning. The intensive schedule and time constraints were also noted as minor limitations. Overall, the findings demonstrate the effectiveness of the training program in enhancing geo-literacy across multiple dimensions.

The observed significant improvement in geo-literacy scores following the short-term

training program is consistent with both national and international evidence highlighting the effectiveness of structured GIS capacity-building interventions (Meechandee & Meekaew, 2025). Similar initiatives in India, such as GIS training programs conducted by ICAR-CIFRI, have reported enhanced participant competencies in applying geospatial methodologies to domain-specific contexts, reinforcing the role of targeted, hands-on training in bridging knowledge gaps (ICAR-CIFRI, 2026). Additionally, training models implemented by Geoinfra Technologies India have demonstrated that integrating theoretical foundations with practical applications in GIS and remote sensing leads to substantial cognitive gains and skill development among diverse learner groups (Geoinfra Technologies India, 2023). These findings corroborate the results of the present study, where improvements were observed across foundational, applied, and theoretical domains of geo-literacy.

Internationally, comparable outcomes have been documented in technology-integrated geography education programs. For instance, an ICT-based intervention in Greece reported significant improvements in statistical and geospatial literacy, emphasizing the importance of interactive and application-oriented pedagogy in enhancing spatial cognition (Rizou et al., 2022). Such approaches align closely with the present study's training design, which combined theoretical instruction with hands-on and field-based learning, resulting in notable gains particularly in the domains of basic concepts and application of GIS. Furthermore, global literature suggests that demographic factors, including gender, age, and educational background, influence learning outcomes in geo-literacy initiatives

(Vidanaralage et al., 2022). This is reflected in the current study, where female participants, individuals with medical backgrounds, and those without prior GIS experience demonstrated comparatively higher learning gains.

The finding that participants above 30 years exhibited greater improvement is supported by previous studies indicating that mature learners may benefit from higher motivation levels and the ability to contextualize new knowledge within existing professional experience (Bai et al., 2023). Similarly, participants without prior GIS exposure showed more pronounced improvements, likely due to the acquisition of entirely new competencies, whereas those with prior knowledge exhibited relatively incremental gains. These patterns highlight the importance of tailoring training programs to accommodate varying levels of prior knowledge and learning needs.

Collectively, the evidence from this study and existing literature confirms that short-term, intensive GIS training programs can significantly enhance geo-literacy across multiple knowledge domains (Meechandee & Meekaew, 2024). The effectiveness of such programs is strongly associated with experiential learning approaches, including hands-on exercises, real-world datasets, and collaborative mini projects. In the present study, the integration of public health applications further strengthened the relevance of training, enabling participants to connect theoretical concepts with practical implementation. The collaborative nature of mini projects also fostered teamwork, critical thinking, and problem-solving skills, which are essential for professional practice in public health and related fields.

However, certain limitations must be acknowledged. The absence of standardized and validated assessment instruments limits the ability to rigorously quantify learning outcomes and compare findings across studies. Although statistical analyses were conducted, future research should incorporate more robust evaluation frameworks, including psychometric validation of tools and longitudinal follow-up to assess knowledge retention and real-world application. Addressing these limitations will enhance the reliability, scalability, and policy relevance of GIS capacity-building programs. Overall, the findings reinforce the growing recognition of geo-literacy as a critical competency for evidence-based decision-making in public health, environmental management, and sustainable development, and highlight the potential for scaling such training models across diverse institutional and geographic contexts.

Strength and Limitatins

The reliance on immediate post-training assessments limits evaluation of long-term retention and real-world application. The absence of standardized, validated instruments and effect size measures reduces methodological rigor and interpretability. Lack of qualitative data restricts insight into participant experiences, while variability in baseline knowledge, potential self-selection bias, small sample size, and heterogeneity may limit generalizability. Despite these constraints, the findings confirm that short-term GIS training effectively enhances geo-literacy across diverse groups, particularly through experiential and application-based learning. Future research should adopt longitudinal and mixed-method approaches,

incorporate validated tools, and report effect sizes. Sustained investment in geo-literacy is essential for strengthening the geospatial workforce and supporting public health and sustainable development.

Conclusion

The findings confirm the effectiveness of the training program in enhancing geo-literacy and geospatial competencies, with significant improvements across foundational, applied, and theoretical GIS domains. Variations based on demographic and educational factors highlight the adaptability of the program to diverse learner profiles and

its role in bridging geo-literacy gaps. The integration of experiential and application-oriented learning strengthened participants' spatial analytical abilities, particularly in public health contexts. Overall, the 21-day winter school demonstrates the value of structured, hands-on capacity-building initiatives in advancing geospatial skills. Future efforts should focus on standardized curricula, validated evaluation methods, and long-term assessment of skill retention and application to enhance scalability and impact. Such initiatives are critical for strengthening public health systems and supporting sustainable development through geospatial technologies.

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A Comparative Analysis of Emotional Competence among Secondary School Girls Students in U.P. Board and C.B.S.E. Affiliated Schools

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ABSTRACT

*Emotional competence plays a significant role in adolescents' psychological and interpersonal development by facilitating self-understanding, motivation, emotional regulation, and effective social functioning. The present study investigated differences in five dimensions of emotional competence, self-development, self-awareness, self-motivation, emotional stability, and managing relations among secondary-school girls enrolled in U.P. Board and C.B.S.E. affiliated schools in the Meerut Region of Uttar Pradesh, India. Using a comparative research design, data were collected from 100 students, comprising 50 from each educational board. Emotional competence was assessed using the Emotional Intelligence Scale developed by Hyde, Pethe, and Dhar. Descriptive statistics and independent-samples *t* tests were employed to examine group differences. Although U.P. Board students obtained higher mean scores on self-development, self-awareness, and emotional stability, C.B.S.E. students reported higher mean scores on self-motivation and managing relations. However, none of the observed differences reached statistical significance at the .05 level. The findings suggest that school-board affiliation was not significantly associated with the selected dimensions of emotional competence. The study underscores the importance of fostering emotional competencies across diverse school contexts.*

Key words: emotional competence, emotional intelligence, self-development, self-awareness, self-motivation, emotional stability, managing relations, secondary school girls, school board, India

Introduction

Education is increasingly conceptualized as a process of holistic human development rather than the transmission of academic knowledge alone. Although academic achievement and cognitive competencies

remain central educational outcomes, effective development also requires students to understand themselves, regulate emotions, sustain purposeful motivation, respond adaptively to challenges, and establish constructive interpersonal relationships. These

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competencies are particularly significant during adolescence, a developmental period marked by substantial psychological, cognitive, social, and emotional transitions.

Emotional intelligence and emotional competence have therefore received increasing attention in educational and psychological research. Salovey and Mayer (1990) conceptualized emotional intelligence as the capacity to perceive, understand, and regulate emotions, while Goleman (1995) extended the construct to include self-awareness, self-regulation, motivation, empathy, and social skills. Subsequent research has linked emotional competencies with adolescent well-being, adjustment, interpersonal functioning, and educational outcomes. For example, systematic reviews have reported positive associations between emotional intelligence and subjective and psychological well-being among adolescents (Llamas-Díaz et al., 2022; Ruiz-Ortega & Berrios-Martos, 2023). Mancini et al. (2024) further highlighted the potential protective role of trait emotional intelligence in adolescent psychological well-being, while noting the importance of cultural and methodological considerations.

The educational significance of these competencies is also supported by evidence concerning school environments and social-emotional learning. Izaguirre et al. (2023) reported relationships among school climate, life satisfaction, emotional intelligence, resilience, and perceived academic performance. Similarly, Cipriano et al. (2023), synthesising 424 studies across 53 countries and involving more than 575,000 students, found that universal school-based social and emotional learning programmes were associated with improvements in social-

emotional skills, behaviour, relationships, school functioning, and academic achievement.

Against this background, the present study examines five dimensions of emotional competence: self-development, self-awareness, self-motivation, emotional stability, and managing relations. These dimensions represent complementary intrapersonal and interpersonal aspects of emotional functioning. The study compares secondary-school girls enrolled in U. P. Board- and C.B.S.E. affiliated schools in the Meerut Region. Rather than assuming that differences in educational-board contexts necessarily produce differences in emotional competence, the study empirically examines whether significant differences exist between the two groups.

Rationale of the Study

Adolescence is a critical developmental stage in which emotional regulation, self-understanding, motivation, and interpersonal skills undergo substantial development. Secondary-school girls experience academic pressures, changing peer relationships, emerging aspirations, family expectations, and expanding social responsibilities, making emotional competence particularly relevant to their adjustment and overall development. Although educational-board affiliation is frequently considered in comparative educational research, limited empirical attention has been given to whether students from different boards differ in specific dimensions of emotional competence. Contemporary evidence suggests that emotional development is shaped by a broader educational ecology involving school climate, interpersonal relationships, individual characteristics, and social-emotional learning opportunities. Accordingly, the present study

compares secondary-school girls from U.P. Board and C.B.S.E. affiliated schools in the Meerut Region across five dimensions of emotional competence.

Statement of the Problem

The problem is stated as, "A Comparative Analysis of Emotional Competence among Secondary School Girls Students in U.P. Board and C.B.S.E. Affiliated Schools"

Objectives of the Study

The following objectives were framed for the study:

1. To compare self-development among girls studying in U.P. Board and C.B.S.E. affiliated secondary schools.
2. To compare self-awareness among girls studying in U.P. Board and C.B.S.E. affiliated secondary schools.
3. To compare self-motivation among girls studying in U.P. Board and C.B.S.E. affiliated secondary schools.
4. To compare emotional stability among girls studying in U.P. Board and C.B.S.E. affiliated secondary schools.
5. To compare managing relations among girls studying in U.P. Board and C.B.S.E. affiliated secondary schools.

Hypotheses Objectives of the Study

The following null hypotheses were formulated:

1. There is no significant difference in self-development between girls studying in U.P. Board- and C.B.S.E.-affiliated secondary schools.
2. There is no significant difference in self-awareness between girls studying in U.P.

Board- and C.B.S.E.-affiliated secondary schools.

3. There is no significant difference in self-motivation between girls studying in U.P. Board- and C.B.S.E.-affiliated secondary schools.
4. There is no significant difference in emotional stability between girls studying in U.P. Board- and C.B.S.E.-affiliated secondary schools.
5. There is no significant difference in managing relations between girls studying in U.P. Board- and C.B.S.E. affiliated secondary schools.

Research Design

A comparative research design was employed to examine differences between two independent groups of secondary school girls.

Participants and Sample

The sample consisted of 100 secondary level girls studying in the Meerut Region. Fifty participants were selected from U.P. Board affiliated schools and 50 from C.B.S.E. affiliated schools. Thus, each group represented 50% of the total sample.

Sampling Procedure

Random sampling was employed for selecting the participants from the relevant population of secondary level girls.

Tools Employed in the study

The study employed the Emotional Intelligence Scale developed by Hyde, Pethe, and Dhar. For the present investigation, only five dimensions: Self-development, Self-awareness, Self-motivation, Emotional stability, Managing relations represented in the available research data were examined.

Statistical Analysis

Descriptive statistics, including means and standard deviations, were calculated for each group. Independent-group t tests were used to determine whether the observed differences between U.P. Board and C.B.S.E.

girls were statistically significant.

The inferential analysis was interpreted using the conventional .05 level of significance. Because the two groups each contained 50 participants, the comparison involved 98 degrees of freedom when treated as an independent-groups t test.

Analyses and Interpretation of the Data

Table-1: Comparison of Self-Development variable of Emotional Intelligence between U.P. Board and C.B.S.E. Girls Students

S. No.	Name of Group	N	Mean	S.D.	t-value	Level of Significance
1.	Girls Studying in U.P. Board affiliated Schools	50	8.50	1.39	0.5606	Not Significant
2.	Girls Studying in C.B.S.E. Affiliated Schools	50	8.34	1.46		

The U.P. Board group obtained a mean score of 8.50 (SD = 1.39), whereas the C.B.S.E. group obtained a mean score of 8.34 (SD = 1.46). The mean difference was 0.16 points. The reported independent-group t value was 0.561, which did not reach statistical significance at the .05 level.

Thus, although the U.P. Board group had

a slightly higher observed mean, the magnitude of the difference was insufficient to provide statistical evidence of a group difference. The result indicates that the two groups were statistically comparable in self-development. The hypothesis 1 was accepted, as the observed difference was not statistically significant at the .05 level.

Table-2: Comparison of Self-Awareness variable of Emotional Intelligence between U.P. Board and C.B.S.E. Girls

S. No.	Name of Group	N	Mean	S.D.	t-value	Level of Significance
1.	Girls Studying in U.P. Board affiliated Schools	50	16.94	7.12	1.52	Not Significant
2.	Girls Studying in C.B.S.E. Affiliated Schools	50	15.32	2.43		

The U.P. Board group recorded a mean score of 16.94 (SD = 7.12), compared with 15.32 (SD = 2.43) for the C.B.S.E. group. The

observed mean difference was 1.62 points in favour of the U.P. Board group.

Despite the higher descriptive mean for

the U.P. Board group, the reported *t* value of 1.520 did not reach statistical significance. Therefore, the observed difference cannot be interpreted as evidence that U.P. Board girls possess significantly greater self-awareness than C.B.S.E. girls in the population represented by this sample.

The substantially larger standard deviation in the U.P. Board group also indicates greater variability in individual scores. This suggests that individual differences within the U.P. Board group may be considerable. The hypotheses 2 were accepted because the observed difference was not statistically significant at the .05 level.

Table-3: Comparison of Self-Motivation variable of Emotional Intelligence Between U.P. Board and C.B.S.E. Girls

S. No.	Name of Group	N	Mean	S.D.	t-value	Level of Significance
1.	Girls Studying in U.P. Board affiliated Schools	50	27.84	1.97	1.728	Not Significant
2.	Girls Studying in C.B.S.E. Affiliated Schools	50	28.56	1.21		

The C.B.S.E. group obtained a higher mean score on self-motivation ($M = 28.56$, $SD = 1.21$) than the U.P. Board group ($M = 27.84$, $SD = 1.97$). The observed mean difference was 0.72 points.

The reported *t* value of 1.728 was not statistically significant at the .05 level. Therefore, the higher descriptive mean of the C.B.S.E. group does not provide sufficient

evidence for a statistically significant difference in self-motivation.

The lower standard deviation among C.B.S.E. participants suggests comparatively greater consistency in their scores, whereas the U.P. Board scores demonstrated greater variability. The hypotheses 3 were accepted because the observed difference was not statistically significant at the .05 level.

Table-4: Comparison of Emotional Stability variable of Emotional Intelligence Between U.P. Board and C.B.S.E. Girls

S. No.	Name of Group	N	Mean	S.D.	t-value	Level of Significance
1.	Girls Studying in U.P. Board affiliated Schools	50	16.92	1.99	1.294	Not Significant
2.	Girls Studying in C.B.S.E. Affiliated Schools	50	16.42	1.86		

The U.P. Board group obtained a mean of 16.92 ($SD = 1.99$), whereas the C.B.S.E. group obtained a mean of 16.42 ($SD = 1.86$). The mean difference was 0.50 points.

The reported *t* value of 1.294 was not statistically significant. Hence, there is insufficient evidence to conclude that the two school-board groups differ in emotional stability.

The relatively similar standard deviations further indicate broadly comparable variability in the two groups. The hypothesis 4 was

accepted, as the observed difference was not statistically significant at the .05 level.

Table-5: Comparison of Managing Relations variable of Emotional Intelligence Between U.P. Board and C.B.S.E. Girls

S. No.	Name of Group	N	Mean	S.D.	t-value	Level of Significance
1.	Girls Studying in U.P. Board affiliated Schools	50	17.96	1.69	0.505	Not Significant
2.	Girls Studying in C.B.S.E. Affiliated Schools	50	18.12	1.47		

The C.B.S.E. group obtained a mean score of 18.12 (SD = 1.47), compared with 17.96 (SD = 1.69) for the U.P. Board group. The mean difference was only 0.16 points.

The reported t value of 0.505 was not

statistically significant. Consequently, the observed difference provides no statistical basis for concluding that the groups differ in their ability to manage relationships. The hypotheses 5 was accepted.

Table-6: Overall Comparison and Summary of Group Comparisons Across the Five Dimensions

Dimension	U.P. Board M	C.B.S.E. M	Reported <i>t</i>	Result
Self-development	8.50	8.34	0.561	Not significant
Self-awareness	16.94	15.32	1.520	Not significant
Self-motivation	27.84	28.56	1.728	Not significant
Emotional stability	16.92	16.42	1.294	Not significant
Managing relations	17.96	18.12	0.505	Not significant

The overall pattern indicates that none of the five dimensions yielded a statistically significant difference between the two groups. The direction of the descriptive differences varied across dimensions: U.P. Board girls had higher means in three dimensions, whereas C.B.S.E. girls had higher means in two dimensions.

Discussion

The principal finding of the study is that

school-board affiliation was not associated with statistically significant differences in any of the five investigated dimensions of emotional competence. This finding is important because it indicates that differences between educational boards should not automatically be interpreted as differences in students' emotional development.

The finding concerning self-development is consistent with a broader contemporary understanding of emotional and social

competence as capacities that develop through multiple contexts. The slightly higher U.P. Board mean did not reach statistical significance, suggesting that the educational-board category alone provides insufficient evidence for explaining differences in students' orientation towards personal growth.

The result for self-awareness is particularly interesting because the U.P. Board group showed a higher descriptive mean. However, statistical non-significance indicates that the observed difference may reflect sample variation rather than a systematic population difference. Recent research has emphasized the close relationship between self-concept and emotional intelligence during adolescence. Salunkhe's (2024) systematic review synthesized 19 studies and identified links between emotional intelligence, self-concept, social competence, academic achievement, and well-being. The present result therefore supports the importance of self-awareness as an educational concern but does not provide evidence that one school board is associated with greater self-awareness.

The self-motivation results showed the reverse descriptive pattern. C.B.S.E. girls had a higher mean than U.P. Board girls, but the reported *t* value was not statistically significant. This finding is consistent with the broader literature suggesting that motivational and emotional outcomes are influenced by multiple psychological and contextual variables. Emotional intelligence has been associated with academic performance, but contemporary evidence does not imply that a single institutional characteristic explains such outcomes. A 2023 systematic review and meta-analysis reported a positive relationship between emotional intelligence and academic

performance and also indicated that contextual variables can influence the strength of this relationship.

The finding concerning emotional stability is similarly non-significant. U.P. Board girls obtained a slightly higher mean, but the difference was not statistically established. Recent systematic reviews have consistently identified emotional intelligence as relevant to adolescent well-being. Ruiz-Ortega and Berrios-Martos (2023) reviewed 47 studies and concluded that adolescents with higher emotional intelligence generally reported higher subjective and psychological well-being. Llamas-Díaz et al. (2022) likewise identified a significant association between emotional intelligence and subjective well-being. These findings reinforce the educational importance of emotional stability, but they do not contradict the present result because the current investigation addresses differences between two school-board groups rather than the relationship between emotional competence and well-being.

The result for managing relations is also noteworthy. The C.B.S.E. group recorded a marginally higher mean, but the difference was extremely small and statistically non-significant. Contemporary research indicates that interpersonal relationships are closely connected with social-emotional competence. Yang et al. (2023), examining reciprocal associations among social-emotional competence, teacher-student relationships, peer relationships, and academic achievement, highlighted the interconnected nature of these variables. The present finding similarly suggests that interpersonal functioning should be understood as part of a broader relational ecology rather than attributed simply to school-board affiliation.

School climate is another important contextual factor. Izaguirre et al. (2023) found that school climate and life satisfaction were directly related to perceived academic performance, while emotional intelligence and resilience operated indirectly through life satisfaction. This evidence provides a useful interpretation of the present findings: students' emotional development may be influenced less by the formal label of an educational board and more by the quality of the environment in which educational experiences occur.

The importance of the school environment is further supported by Panwar (2023), whose study of adolescents examined school climate and emotional intelligence and reported that school climate was relevant to emotional-intelligence outcomes. Although the design and population differ from the present investigation, the finding supports the need to consider school-level variables in future comparative research.

Large-scale evidence also supports the importance of intentional school-based emotional development. Cipriano et al. (2023) conducted a contemporary meta-analysis encompassing 424 studies, 252 interventions, 53 countries, and more than 575,000 students. Their findings showed that universal school-based social and emotional learning interventions were associated with improvements in social-emotional skills, behaviour, peer relationships, school functioning, school climate, and academic achievement. This is particularly relevant to the present study because the absence of significant differences between school boards suggests that emotional competence may be better addressed as a universal educational priority than as a board-specific characteristic.

Evidence from India also supports the

feasibility of strengthening emotional competence through educational interventions. Bagul and Chaudhari (2021) investigated a life-skills training programme involving 100 school students and specifically examined its role in adolescent emotional competence. Tyagi and Pandey (2022) also examined the effect of Sahaj Yoga meditation on emotional competence among adolescent girls, demonstrating continuing Indian research interest in educational and psychosocial approaches to emotional development.

Recent systematic work on measurement also highlights the multidimensional character of social-emotional competencies. Martinez-Yarza et al. (2023) systematically reviewed instruments measuring social and emotional skills among school-aged children and adolescents and noted considerable diversity in conceptualisations and measurement approaches. This observation is important for interpreting the present findings because the five dimensions examined here should not be treated as interchangeable or as a single undifferentiated psychological characteristic.

The present findings are therefore broadly compatible with contemporary literature in one important respect: emotional competence is embedded within a complex developmental and educational context. Recent research does not support reducing emotional development to one institutional characteristic. Instead, emotional competence appears to be related to personal characteristics, relationships, school climate, well-being, motivation, and structured educational experiences.

The present study also contributes a useful contextual finding: although the two groups differed descriptively on individual

dimensions, none of those differences was statistically significant. This finding cautions against making categorical claims about emotional competence on the basis of school-board affiliation.

At the same time, the non-significant results should not be interpreted as proof that U.P. Board and C.B.S.E. schools are identical in all aspects of emotional development. The sample was relatively small, geographically restricted, and limited to girls. Statistical non-significance means that the present data did not provide sufficient evidence of a difference; it does not demonstrate that the two populations are perfectly equivalent.

Conclusion

The present study compared five dimensions of emotional competence among 100 secondary-school girls studying in U.P. Board- and C.B.S.E.-affiliated schools in the Meerut Region. The findings demonstrated that none of the five dimensions: self-development, self-awareness, self-motivation, emotional stability, and managing relations showed a statistically significant difference between the two groups.

The U.P. Board group obtained higher descriptive means in self-development, self-awareness, and emotional stability, whereas the C.B.S.E. group obtained higher descriptive means in self-motivation and managing relations. These differences, however, did not attain statistical significance.

The central conclusion is therefore that school-board affiliation did not emerge as a statistically significant differentiating factor in the five selected dimensions of emotional competence within the present sample.

The findings should not be interpreted

as indicating that emotional competence is unimportant. Rather, they reinforce the need to look beyond institutional categories and consider the wider developmental ecology of students. Contemporary research indicates that emotional competence is connected with well-being, interpersonal relationships, school climate, academic functioning, and social-emotional learning opportunities.

Accordingly, emotional development should be treated as a shared educational responsibility across school systems. The objective of secondary education should extend beyond academic attainment towards the development of students who are self-aware, motivated, emotionally balanced, personally growth-oriented, and capable of maintaining constructive relationships.

Limitations

1. The study was based on a relatively small sample of 100 secondary-school girls.
2. The sample was restricted to the Meerut Region.
3. Only girl students were included.
4. Only U.P. Board and C.B.S.E. affiliated schools were represented.
5. Five selected dimensions of emotional competence were examined.
6. The cross-sectional comparative design does not permit causal conclusions.
7. The findings should not be generalised to all U.P. Board or C.B.S.E. students without replication using larger and more diverse samples.
8. Because the study uses reported summary statistics, future work using the raw dataset could provide additional analyses such as effect sizes, confidence intervals, and tests of assumptions.

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Assessing the Practice of Open Defecation Among Residents of Bamhori Bika of Sagar District and its Health Impacts

Megha Das* & Ratnesh Das**

ABSTRACT

Access to sanitary facilities is crucial for public health, human development, and well-being. However, 1.7 billion people worldwide lack access to improved sanitation facilities. This study was aimed at assessing the practice of open defecation among residents of Bamhori Bika of Sagar district and its consequences on health. It was cross-sectional and designed to explore the factors that are aligned with open defecation from March to June 2024. A closed-ended structured questionnaire was used to collect sociodemographic data from 400 residents aged 18 years and above. Pearson Chi-square test was performed to determine any relationship between the socio-demographic characteristics of residents, toilet facilities, and awareness of the effects of open defecation on health at the test significance of 5%. The total number of toilet facilities counted during the study was 116. 2.58% (n = 3) were public toilets and 97.41% (n = 113) were households toilets. 71% (284) of households were without toilets. Out of 113 households with toilets, 91 (80.53%) were used by only the Landlord/Lady and their families to the exclusions of tenants while 22(19.47%) were used by everyone. Furthermore, the majority (59.29%, n = 67) of the toilets were Open-pits. 35.3% (n= 141) of the residents practice open defecation. Out of them, 76.5%(n=107) opt due to their habits. Next reason (57% n=81) came out was feeling comfortable followed by unawareness (36.4%) and lack of water (34%). Almost all the residents 76.5% (n = 306) knew that open defecation tends to cause diseases. Open defecation practice was prevalent among residents in Bamhori Bika of Sagar district, as a significant number of the residents engaged in open defecation. The main cause of open defecation was the limited number of decent toilet facilities. Be as it may, the government's intervention, enactment of strict by-laws, fines, and support from NGOs were the proposed measures to solve indiscriminate open defecation among residents in poor sub urban areas of Sagar district

Key words: Open Defecation, Sanitation, Non-governmental Organizations (NGOs), Toilet Facility

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Introduction

The practice of defecating in the open (such as in fields, bushes, or by bodies of water) can be devastating for public health. Exposed faecal matter contaminates food, water and the environment, and can spread serious diseases, such as cholera. Coupled with poor hygiene practices, exposure to faecal matter remains a leading cause of child mortality, morbidity, undernutrition and stunting, and can negatively impact a child's cognitive development.

Approximately 3.5 billion people still do not have safe sanitation services, while 419 million people practice "open defecation"

Amongst countries suffering from this problem, India has to bear the brunt of the impact on its rural population with associated levels of high infant mortality and contagion. Villagers experience psychosocial stress due to the risk of physical attacks alternative sanitation practices including open defecating carry. These include serious attacks including rape and molestation, as well as hazards such as snake and mosquito bites, and foot injury incurred due to lack of adequate footwear. The Nirmal Bharat Abhiyan (2012) and Swachh Bharat Abhiyan (2014) were launched as renewed efforts to advance India's Total Sanitation Campaign initiated in 2000. These programs aimed to expand sanitation coverage by offering incentives to citizens and investing in infrastructure development, including the construction of latrines and improved access to sanitation facilities. While coverage typically refers to household access to toilets and sewerage systems, it does not necessarily reflect actual usage. Moreover, reporting the number of latrines installed-regardless of their quality-is often easier than

tracking sanitation behaviour across India's diverse population, which varies significantly by region.(8,9,10). Continued support and investment in sanitation by families, communities, and the government is needed to change people's habits, so that using a toilet becomes a normal and accepted part of everyday life for everyone. A study in rural Timor found that educated individuals were most likely to use latrines because they were aware of the benefits of latrine use and harms of OD practices. This study is an attempt to find out the extent of latrine usage by the villagers of Bamhori Bika of Sagar district and to explore the type of health problems they face due to the practice of open defecation.

Study Design

The study was cross-sectional and designed to explore the prevalence of open defecation in the rural area of Sagar district. It was also directed towards exploring the factors that are aligned with open defecation and health implications from March to June 2024. The design was to allow for mere observation of events and reporting them as they unfold in order to understand the situation of open defecation as it existed during the period of the study.

Variables of Interest

Practice of open defecation, factors that influence residents to practice open defecation and health implications of open defecation at the rural areas of Sagar district.

Study Site

The research was carried out in the municipality of Bamhori Bika Bamhori Bika is a Village in Sagar Tehsil in Sagar District of Madhya Pradesh State, India. It belongs to

Sagar Division. It is located 11 KM towards East from District headquarters Sagar. 7 KM from Sagar. Total population of Bamhori Bika Village is 2367 out of which 1269 are males while 1098 are females as per Population Census 2011, and number of houses are 488. Village literacy rate is 77.87%, Male literacy stands at 88.31% and the Female Literacy rate is 65.75%. Farming is the most common occupation.

Study Population, Sampling Technique and Sample Size

The study focused on all males and females who are permanent or semi-permanent residents of the municipality and are 18 years of age or older. Using a simple random technique, 43 out of the 75 communities within the Bamhori Bika Municipality were chosen. 400 respondents were purposively selected and distributed proportionately among the 43 communities using the quota technique. To select the households in each of the selected communities, a systematic sampling technique where every 11th house was used.

Instrumentation, Data Collection and Analysis Procedure

A structured closed-ended questionnaire was used to gather information from the sampled residents. The questionnaire was designed and divided into three sections: the respondents' socioeconomic information, their access to working restrooms, and their perception of the prevalence of open defecation. From March to June 2024, the researchers used in-person interviews to administer the instrument. The Software Package for Social Sciences (SPSS) version 23 (IBM, USA), Microsoft Excel version 2016

(Microsoft, USA), and an Interactive chi-square calculator (Preacher, K. J. 2001) were used to analyse the data. The test significance selected was 5%. Descriptive statistics were done to analyse the data on the socio-demographics of residents, toilet facilities and types, access to toilets and modes of faecal disposal, causes of open defecation, awareness of the effects of open defecation on health, and attitude towards open defecation. Pearson Chi-square test was performed to determine any relationship between the socio-demographic characteristics of participants, toilet facilities, and awareness of the effects of open defecation on health.

Socio-Demographic Characteristics of Residents

Table 1 shows the socio-demographic study of the residents stratified according to gender, marital status, occupation, ethnicity, age, religion, and educational level. Of all studied residents ($n = 400$), 56% ($n = 223$) were males, whereas 44% ($n = 177$) were females. The number of male and female residents differs significantly ($p < 0.05$), as presented in Table 2. Again, most of the residents 77% ($n = 307$) were married. There was a significant difference between residents who were married and those who were single ($p < 0.05$), as indicated in Table 2. The predominant occupation of the studied residents was farming, 50% ($n = 200$), followed by government employees, 27% ($n = 107$), while 11% ($n = 47$) were unemployed. The majority of the residents were Hindu (77%, $n = 306$) while 13% ($n = 54$) were Muslims. Most of the residents had no formal education (66%, $n = 262$), while 33% had some level of education.

Table-1: Socio-demographic study of residents in the Bamhori Bika Municipality

Study Variable	Frequency	Percent (%)
Gender		
Male	223	56
Female	177	44
Marital status		
Married	307	77
Single	93	23
Occupation		
Farmer	200	50
Government employee	107	27
Petty trader	26	7
Business	20	5
Unemployed	47	11
Ethnicity		
Hindi	223	55
Bundeli	127	32
Tribes	50	13
Age group		
18-30	206	52
31-40	136	34
41-50	40	10
51 & above	18	4
Religion		
Muslim	54	13
Hindu	306	77
Other	40	10
Education		
No formal Education	262	66
Primary Education	79	20
Senior High School	44	11
Tertiary	10	2
Other	5	1

Table-2: Chi-square Test for Socio-demographic Variables

Variable	Observed		Expected	χ^2	DF	p
Gender	Male	223				
	Female	177	200	5.29	1	0.021
Total		400				
Marital status	Married	307				
	Single	93	200	114.49	1	0
Total		400				
Occupation	Farmer	200				
	Government employee	107				
	Petty trader	26	80	284.175	4	0
	Business	20				
	Unemployed	47				
Total		400				
Ethnicity	Hindi	223				
	Bundeli	127	133.3	112.713	2	0
	tribes	50				
Total		400				
Age group	18-30	206				
	31-40	136				
	41-50	40	100	228.56	3	0
	51 & above	18				
Total		400				
Religion	Muslim	54				
	Hindu	306	133.3	336.224	2	0
	Others	40				
Total		400				
Education	No formal Education	262	80	561.825	4	0
	Primary Education	79				
	Senior High School	44				
	Tertiary	10				
	Others	5				
Total		400				

Toilet Facilities And Types In The Bamhori Bika Municipality

Figure 1 presents the distribution of toilet facilities in the Bamhori Bika Municipality. The total number of toilet facilities (both public and household) counted during the study was 135.

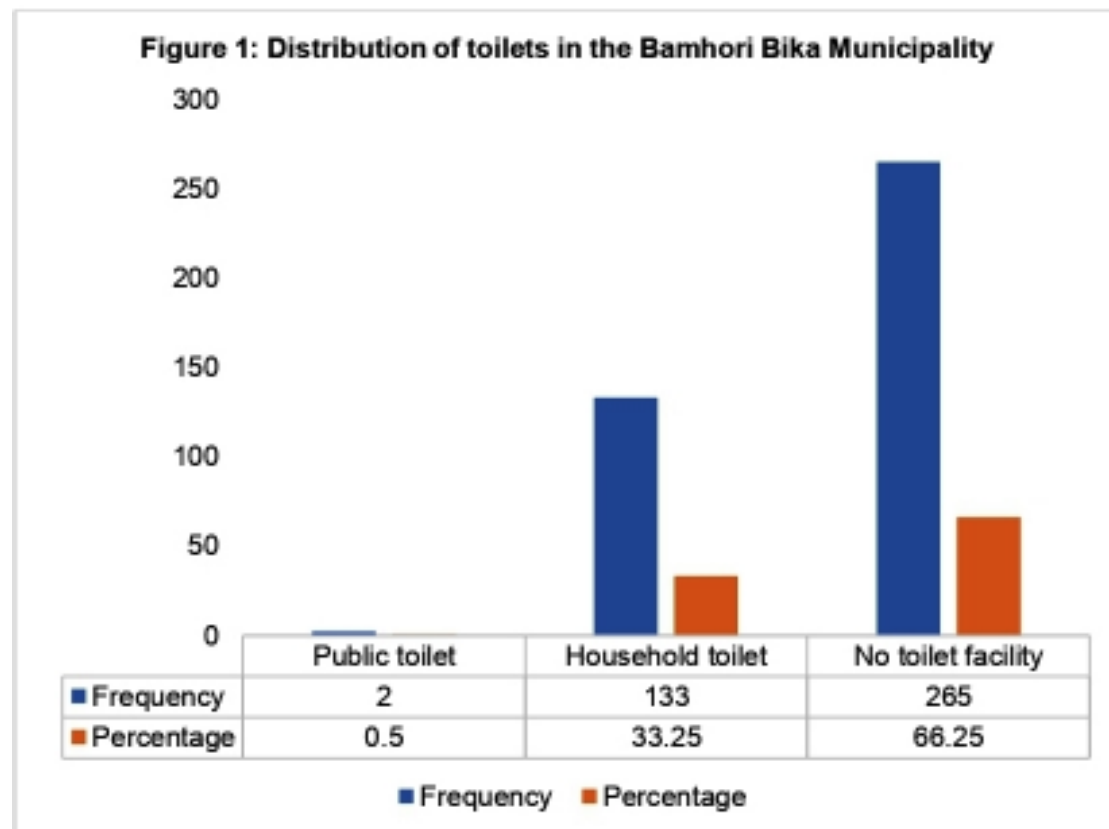
0.5% (n = 2) were public toilets and 33.25% (n = 133) were household toilets. 66.25% (265) of households were without toilets as shown in Figure 1. The number of households with toilet facilities and the households without toilet facilities differed significantly ($p < 0.05$)

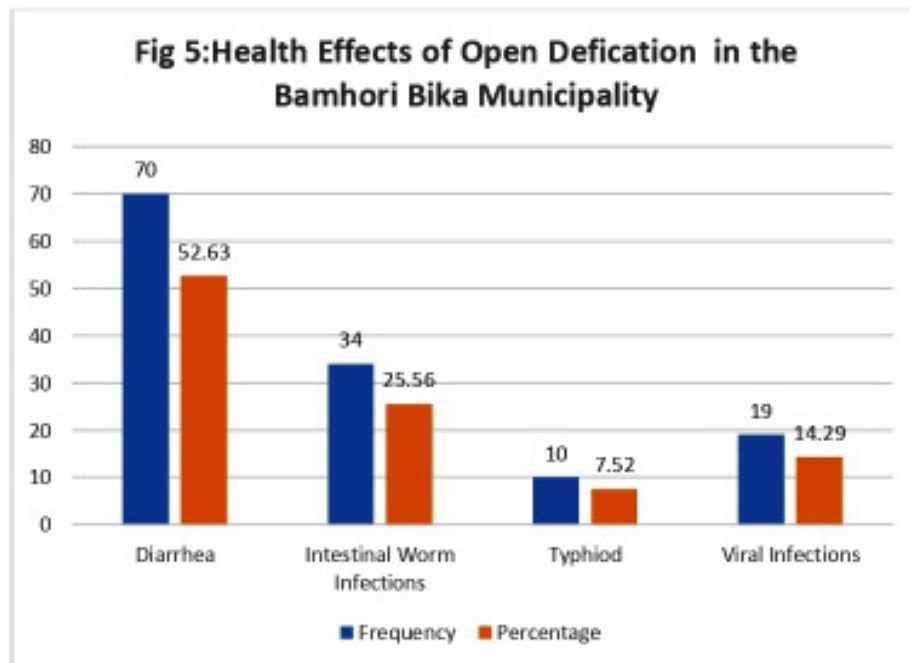
as presented in Table 3. Out of 133 households with toilets, 111 (27.8%) were used by only the Landlord/Lady and their families to the exclusions of tenants while 22 (5.5%) were shared by everyone residing in the house (Fig

2). Furthermore, the majority (52.63%, n = 70) of the toilets were Open-pits, followed by Flush toilets (25.56%, n = 34), then Ventilated Improved Toilet or VIP toilets (14.29%, n = 19), and Twin-Pit toilets (7.52%, n = 10), as shown in Table 3.

Table-3: Type of toilets facilities in the Bamhori Bika Municipality

Type of toilet facility	Frequency	Percent (%)
Open Pit	70	52.63
Flush toilet	34	25.56
Twin Pit	10	7.52
Ventilated improved Toilets (VIP)	19	14.29
Total	133	100

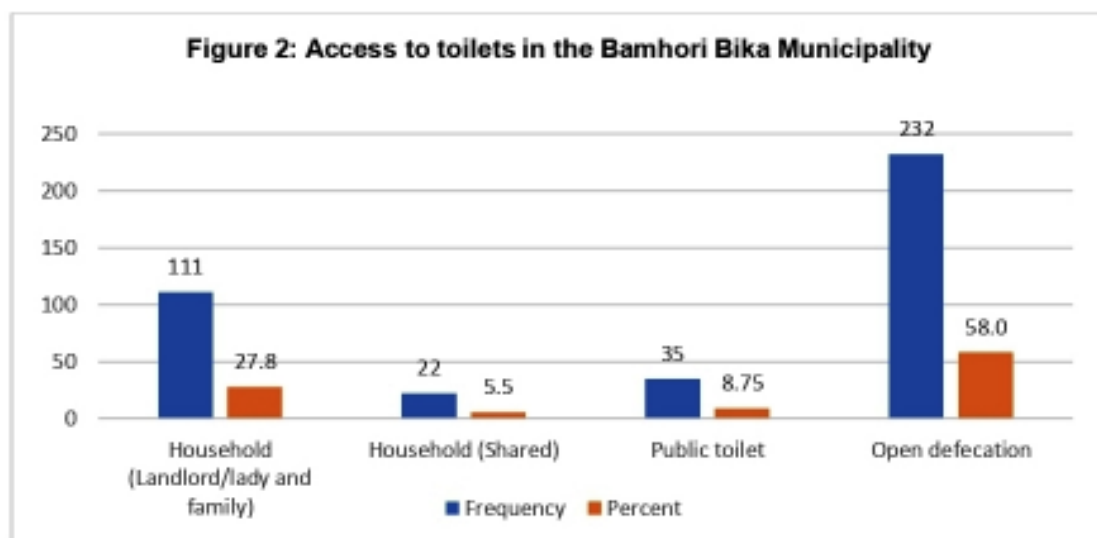




Residents Access To Toilets In Bamhori Bika Municipality

Figure 2 shows the places where residents in Bamhori Bika municipality defecate. 8.75% (n = 35) of the residents use

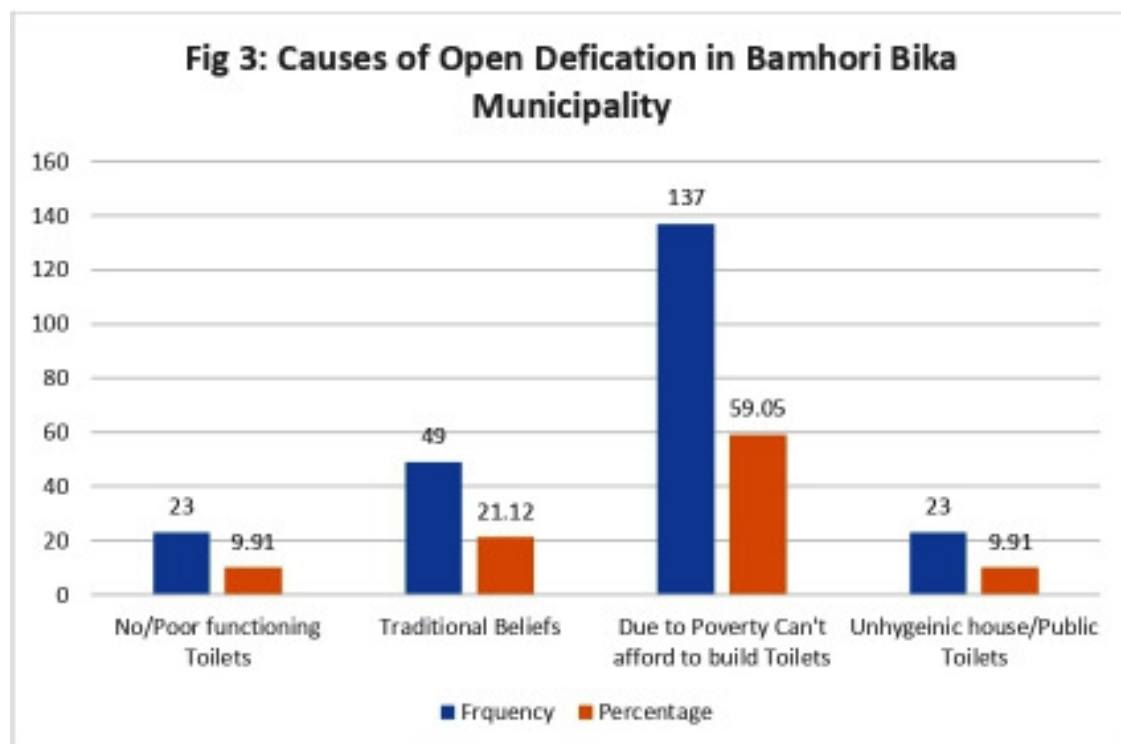
the public toilet, 58% (n = 232) of the residents practice open defecation, 27.8% (n = 111) had their toilet at their respective homes, and 5.5% (n = 22) use shared toilets.



Causes Of Open Defecation Among Residents In Bamhori Bika Municipality

Figure 3 presents the causes of open defecation among residents in the Bamhori Bika Municipality. 59.05% (n = 137) of the residents indicated that the practice of open defecation was due to Poverty, as they could not afford the construction of private toilet

facilities and or could not pay to use public toilets, 21.12% (n = 49) related the practice of open defecation due to traditional beliefs, 9.91% (n = 23) indicated that toilets in their homes as well as public toilets are not hygienic enough for use due to the number of residents using these toilets. Finally, 9.91% (n = 23) mentioned that they had no toilet or poor functioning toilet facilities in their respective homes.



Resident's Awareness And The Effects Of Open Defecation On Health In The Bamhori Bika Municipality

Figure 4 highlights the awareness of residents on the effects of open defecation on health. Most of the residents 76.5% (n = 306) do not knew that open defecation tends to cause diseases. Contrary, 23.5% (n = 94) of

the residents knew that open defecation was a risk factor for the spread of diseases. There was a significant difference between residents who were not aware of and residents who were aware of the effects of open defecation on health ($p < 0.05$), as shown in Table 4.

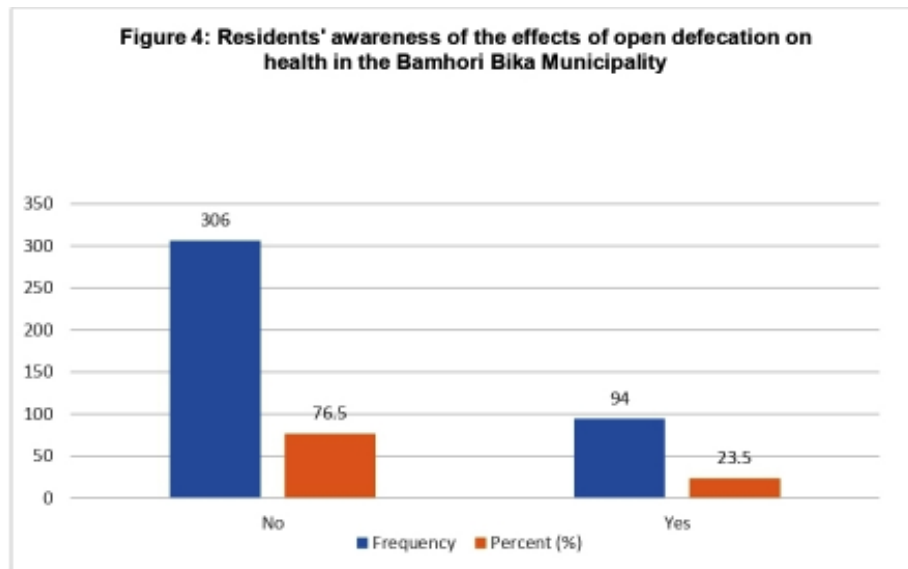
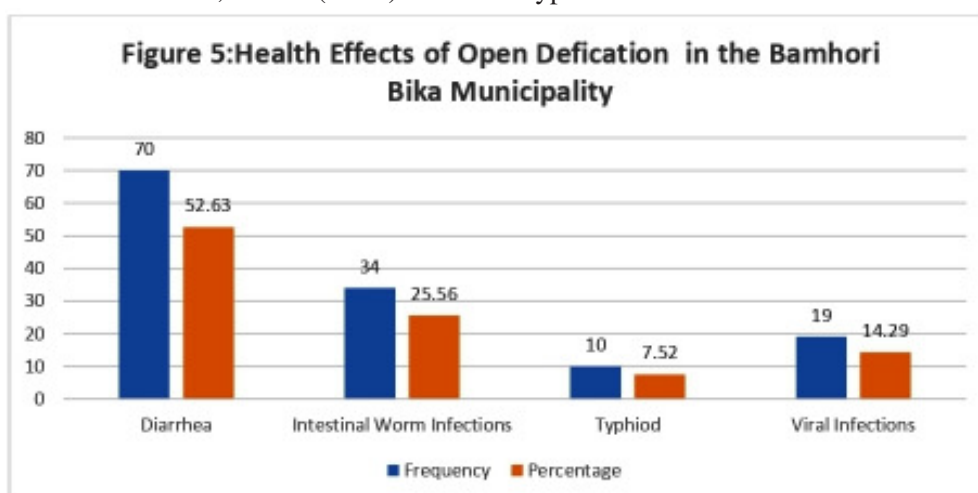


Table-4: Chi-square Test for Residents' Awareness of the Effects of open defecation on Health in the Bamhori Bika Municipality

Variable	Observed	Expected	χ^2	DF	p
No	306	200	112.36	1	0
Yes	94				

Fig.5 highlights the health effects of open defecation among residents of Bamhori Bika. 52.63% (n=70) are frequently facing problem of Diarrhoea, 25.56% (n=34) suffer

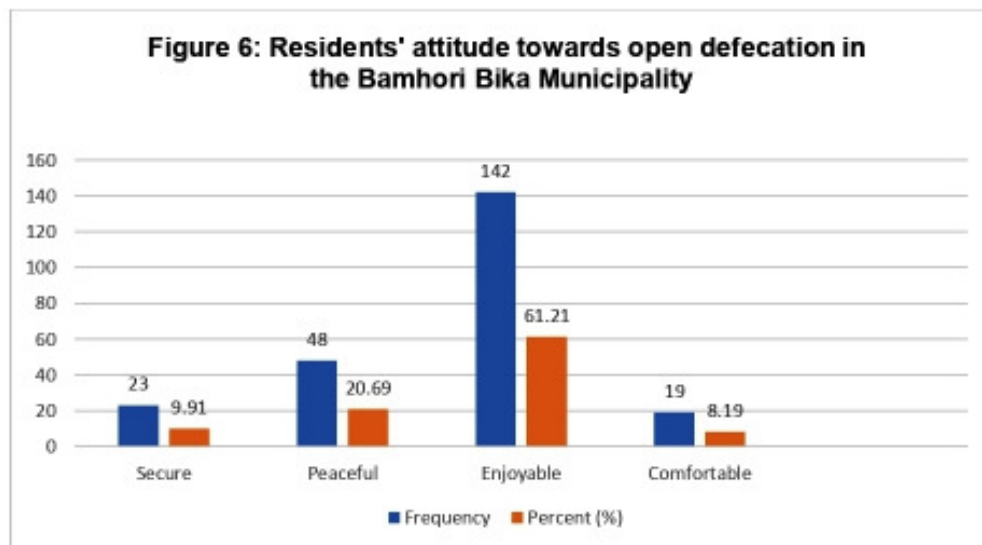
from intestinal worm infections among which children are the major proportion, while 7.52% (n=10) and 14.29% (n=19) suffer from typhoid and viral infections



Resident's Attitude Towards Open Defecation In The Bamhori Bika Municipality

Figure 6, shows the attitude of residents towards open defecation. 61.21% (n = 142)

of residents conceived that open defecation was enjoyable, 20.69% (n = 48) indicated that open defecation was peaceful, 8.19% (n = 19) mentioned that it was comfortable and 9.91% (n = 23) held the belief that open defecation was secure.



Discussion

Open defecation (OD) refers to the practice of defecating or disposing of human feces in fields, forests, bushes, bodies of water, or other open spaces. An estimated 360 million people live without access to latrines in rural India, and millions more practice open defecation despite having latrines. There can be different reasons for open defecation being practiced. Most of the time, a lack of access to a toilet is considered the main reason. However, in some places, even people with toilets in their homes could prefer to defecate in the open area due to various factors, including poor construction and management of facilities, family size, educational status of owners, the presence of children, shortage of water supply, cleanliness of the toilet,

personal preference, cultural taboos, and

others (13,14,15). In 2016, an estimated 60% of the population of India practiced OD, which was 4 times the global rate. Because India may still be a major contributor to global OD rates, reducing the practice will be essential in meeting the 2030 SDG target 6.2. According to JMP reported data, India is responsible for the largest drop in OD between 2015 and 2020 in terms of absolute numbers among all countries, yet high rates of OD in India persist. Although the ownership of rural latrines increased significantly after the introduction of Swachh Bharat mission in Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh, open defecation is still prevalent in these states.

This study showed that 71.25% of the residents had no household toilet, resulting in the practice of open defecation and 35.3%

defecate in open despite having household toilets. This high prevalence of open defecation may be due to their lack of awareness and low socioeconomic status. This finding collaborates with study done by Bharadwaj et al (67%) Geetha (90%), Harishankar et.al (78.8%) and yoga Nath et.al (54%).

This study reveals various factors which influence residents to practice open defecation such as Poor sanitation, Lack of awareness, Non availability of toilets, Public Toilets are available but are grimy, dark, smell bad, or unattractive (due to non-maintenance), toilets are available but there is a risk, e.g. if the public toilets common for all, Public Toilets are not available as part of the household but only at some distance and it may be dangerous to get there at night. In view of above reasons along with scarcity of water and habit, the residents find open defecation enjoyable, comfortable secure, peaceful. Few studies support our findings like Ngwu, 2017 which showed that poverty and lack of toilet facilities are recognized as the main reasons why people practice open defecation. A case study by Nallari illustrates the experience of young girls who defecate in vacant area beside their poor settlement in Bengaluru, India. The participants expressed both the fear of being exposed while passing the slums and the struggle of finding privacy. The study also revealed that the residents suffer so many health problems like Diarrhoea and Intestinal worm Infections, Typhoid, Cholera, viral infections and fever. These findings are similar to other studies like Majumdar et al. explored that open defecation is a confounding factor in the prevalence of hookworm infestation among pregnant women; in that pregnant women who defecate in open fields are at greater risk of hookworm infestation (24.3%) than those who use toilets

(6.4%). Kotian et al. found that people in Bihar State of India who used open defecation showed more positive results for parasitic infection.

The result of this study revealed that open defecation in Bamhori Bika village has serious consequences and implication to the lives and health of the people as it leads to the spread of water borne diseases, parasitic infections making environment unhygienic to others; increases the risk of flooding during rains; deteriorates the quality of drinking water making it unfit for drinking purposes, increases child mortality rate; as well as leads to increases in low birth weights.

Conclusion

Open defecation was prevalent among residents in the Bamhori Bika Municipality, as a significant number of the residents engaged in open defecation. The main cause of open defecation was the limited number of decent toilet facilities. Enjoyable, comfortable, secure, and peaceful was the attitude of residents towards the practice of open defecation in the Bamhori Bika municipal. Disease transmission and other risks associated with open defecation must be made more widely known. In this regard, there is a need to develop proper mechanisms, through organizations, municipal authorities, and local financial institutions to put up more toilet facilities both in households and in the community. Residents also suggested the intervention of the government, enforcement of By-laws, and support from stakeholders as possible ways to curb this menace.

Recommendations

Against this result, the study recommends that state government should a

campaign meant to re-educate the people of the dangers of open defecation using all media possible such as radio, television, newspapers, billboards, among others. The study also recommends that strident laws be enacted and properly executed to prosecute any individual found defecating openly. Again, as a matter of law, toilet facilities must be the most

important component of every living accommodation, stores, show rooms, offices, otherwise, such structure must be demolished. Finally, the government should under swatch Bharat Abhiyan sponsors the building of more public toilets around market areas and their timely maintenance where people can use in easing themselves while away from home.

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Kerala's FYUGP and NEP 2020: Assessing Credit Structure, Flexibility and Student Choice

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ABSTRACT

This article examines the implementation of the National Education Policy (NEP) 2020 in Kerala with particular reference to the Four-Year Undergraduate Programme (FYUGP) and the National Credit Framework (NCF). The study considers whether the changes introduced through FYUGP provide the flexibility, interdisciplinary opportunities, credit mobility and learner choice envisaged in the national policy. It also examines the practical implications of programme duration, credit requirements, multiple entry and exit provisions, and the arrangements for credit accumulation and transfer from a student-centred perspective. The analysis is based on a systematic reading of policy and regulatory documents, curriculum frameworks and credit distribution patterns. The evidence shows that Kerala's FYUGP shares the basic structural features of NEP 2020, although these have been adapted to the state's higher education setting. At the same time, the actual organisation of courses and credits leaves limited room for the flexibility suggested in the policy framework. The multiple exit provisions are not equally accessible in practice, while credit portability and transfer remain subject to institutional and structural constraints. The relatively high academic requirements also add to the workload associated with the four-year pathway. The study therefore finds that FYUGP is better understood as a state-level adaptation of NEP 2020 than as a fundamentally separate model. The Kerala experience also points to a continuing gap between the flexibility described in policy documents and the choices that students can exercise within the institutional structure.

Key words: National Education Policy 2020; Four-Year Undergraduate Programme; National Credit Framework; Higher Education Policy; Academic Flexibility; Credit Architecture; Interdisciplinary Learning; Policy Implementation

Introduction

Higher education has become an important site of policy debate as governments respond to changing expectations about social

equity, employment, citizenship and the production of knowledge. Undergraduate education is now viewed more broadly than as preparation within a particular discipline. It

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is also expected to develop students' ability to reason critically, make informed ethical judgments, respond to change and continue learning beyond formal education (Unterhalter, 2019; Wulff, 2020; UNESCO, 2021). These expectations have contributed to curricular reforms that give greater importance to flexibility, interdisciplinary study and learning outcomes. The emphasis is particularly visible in discussions surrounding Sustainable Development Goal 4, which places quality, inclusion and relevance at the centre of educational development, including at the higher education level (Sayed & Moriarty, 2020; Smith & Heyward, 2023; UNESCO, 2025).

In India, many of these concerns find expression in the National Education Policy (NEP) 2020. The policy seeks to alter the organisation of undergraduate education by giving greater scope for student choice, movement across academic pathways and broader forms of learning (Pratheesh, 2026; 2026a). Its provisions include flexible programme structures, multiple entry and exit points, credit-based progression and interdisciplinary study, with the National Credit Framework providing an overarching structure for the accumulation and recognition of learning (Ministry of Education, 2020; National Credit Framework, 2024). The underlying expectation is that students should be able to make choices about the pace, direction and combination of their studies, while credit portability can allow learning to be recognised across programmes and institutions. Such arrangements are also linked to the wider objective of making higher education more responsive to changing social conditions and employment requirements (Rieckmann, 2017; Leal Filho et al., 2018; Pratheesh, 2026a).

Kerala presents an important setting in which to examine these changes. The state has a long record of public investment in education, experience with credit-based undergraduate programmes and a strong concern for widening educational access. The introduction of the Four-Year Undergraduate Programme (FYUGP) has consequently taken place within an established higher education environment rather than on an institutional blank slate. FYUGP incorporates several elements associated with national reform while attempting to accommodate Kerala's academic practices and the autonomy of its higher education institutions. State policy documents present contextual relevance, academic standards and student welfare as important considerations in implementing the new programme (Kerala Higher Education Department, 2024; Kerala State Higher Education Council, 2024). Yet the presence of these provisions in policy documents does not by itself establish how far students can actually exercise the choices they are offered. As earlier scholarship has pointed out, the significance of higher education reform has to be considered in relation to what such changes mean for learners and their actual educational experience, rather than being judged only by the formal adoption of a policy framework (Barnett, 2000; Barnett et al., 2001).

Recent studies across higher education systems demonstrate that curriculum reforms often reproduce institutional rigidity under the guise of flexibility when credit architectures, assessment regimes, and progression logics remain tightly regulated (Knight, 2001; Lei et al., 2024; Stancy & Pratheesh, 2026). From a student-centred perspective, increased credit loads, restricted exit pathways, and limited credit transferability can undermine the very

objectives of choice and mobility that reforms claim to advance (Demeter, 2020; UNESCO, 2021). Empirical research further underscores that learner engagement, civic competence, and academic well-being are shaped not by policy rhetoric but by the coherence between curriculum design, assessment practices, and pedagogical support (Papay et al., 2017; Pratheesh & Francis, 2024; Padath, 2025; Pratheesh, 2025; 2025a).

Against this background, the study examines how NEP 2020 has taken shape in Kerala through the FYUGP and the National Credit Framework. It focuses on the organisation of undergraduate programmes, the distribution and use of credits, entry and exit provisions, and the place given to interdisciplinary study. The analysis approaches these features from the perspective of students rather than judging the reform simply by whether its stated objectives have been achieved. The central concern is whether the structures introduced under FYUGP give students real scope to choose, move between academic pathways and manage their undergraduate studies with reasonable flexibility. Placing the Kerala model alongside wider national and international discussions on higher education reform, the study draws attention to the difference that can arise between what a reform provides on paper and what students are able to experience within institutions. It therefore argues for closer empirical attention to the way undergraduate reforms are implemented and to their consequences for students.

Review & Theoretical Standpoint

Recent scholarship increasingly frames higher education reform as a response to social complexity, uncertainty, and the expanding

expectations placed upon universities. Curriculum theorists argue that undergraduate education now operates within "super complex" environments, where knowledge structures, societal demands, and learner aspirations intersect in unpredictable ways, requiring flexible, learner-centred, and outcome-oriented curricular models (Barnett, 2000; Barnett et al., 2001). Recent work on NEP 2020 similarly points to changes in undergraduate learning structures, graduate development and the relationship between curriculum and emerging educational needs (Antony & Pratheesh, 2025a; Michael & Pratheesh, 2025). Within this framework, curriculum change is understood not merely as structural adjustment but as a reconfiguration of epistemological priorities, assessment regimes, and institutional relationships with learners (Knight, 2001). The Kerala experience, particularly through FYUGP, further illustrates how this broader policy principles are interpreted and adapted at the state level (Pratheesh, 2025).

Global policy discourse since 2020 has strongly influenced national higher education reforms, particularly through the normative force of Sustainable Development Goal 4, which emphasizes quality, equity, lifelong learning, and relevance to societal challenges (Unterhalter, 2019; Sayed & Moriarty, 2020; UNESCO, 2021, 2025). Studies highlight that flexibility, interdisciplinarity, and credit mobility are increasingly positioned as essential mechanisms for achieving these goals, provided they are operationalized coherently across curriculum design and assessment (Wulff, 2020; Smith & Heyward, 2023). However, empirical research cautions that policy-driven reforms often prioritize regulatory compliance over learner experience, resulting

in partial or symbolic implementation (Demeter, 2020).

Theoretical contributions on outcome-based education and competency frameworks underscore the importance of alignment between learning outcomes, pedagogy, and assessment. Research in professional and disciplinary education demonstrates that clearly articulated outcomes and diversified assessment practices enhance coherence and student preparedness, but only when credit architectures support modularity and academic mobility (Papay et al., 2017; Saenz-Armstrong, 2023). Without such alignment, outcome-based frameworks risk reinforcing conventional academic hierarchies under reformist terminology (Lei et al., 2024).

In the Indian context, NEP 2020 has generated a growing body of scholarship examining its implications for undergraduate education, particularly its emphasis on multidisciplinary learning, multiple entry-exit pathways, and credit transfer through the National Credit Framework (Ministry of Education, 2020; National Credit Framework, 2024). Studies recognize the policy's potential to democratize access and reduce academic risk but simultaneously point to challenges in institutional readiness, credit rationalization, and student awareness (UNESCO, 2021; Smith & Heyward, 2023). Recent Indian scholarship further emphasizes that curricular reforms must be evaluated through their impact on learner agency, civic competence, and academic well-being rather than structural novelty alone (Pratheesh, 2025; Padath, 2025).

At the state level, Kerala's higher education reforms have been examined for their strong public orientation and early adoption of credit-based systems. Existing

studies note gradual thematic expansion and policy responsiveness but also highlight limited empirical evaluation of how new frameworks translate into student-centred outcomes across institutions (Essomba et al., 2022; Webb et al., 2017). Moreover, emerging research stresses that interdisciplinary exposure, social-emotional learning, and supportive pedagogical environments significantly shape academic engagement, underscoring the need to assess reforms beyond formal curriculum documents (Pratheesh & Francis, 2024).

Taken together, the literature reveals a persistent gap between policy intent and educational practice, particularly in the absence of discipline- and learner-focused evaluations. While reform frameworks advocate flexibility, credit mobility, and interdisciplinarity, there remains limited systematic analysis of how these principles are operationalized within undergraduate programmes and experienced by students. This study is theoretically grounded in curriculum complexity theory and learner-centred policy analysis, addressing the need for evidence-based evaluation of undergraduate reform implementation within contemporary higher education systems.

Methodology

The study identifies gaps in flexibility and interdisciplinary integration, contributing to discussions on educational policies and their implementation to improve student experiences and career readiness. The study adopted a qualitative-analytical research design grounded in policy and curriculum analysis to examine the implementation of NEP 2020 through Kerala's FYUGP. The main data sources were official policy documents—namely the National Education Policy 2020, National Credit

Framework, and the Kerala State Curriculum Framework for Undergraduate Education, and FYUGP regulations, and university-level curriculum and examination ordinances of selected universities in Kerala. These documents were thematically analysed based on policy intent, structural design, and operational mechanisms towards academic flexibility, interdisciplinarity, credit transfers, entry-exit provisions, and assessment reforms.

This document analysis was complemented with a comparative interpretive approach to explore the translation of national policy principles into state-level frameworks and institutional practices. It created a systematic analytical matrix to chart policy provisions concerning aspects of curriculum design, including the number of credits, course categories, modularity, exit options and credit transfer mechanisms. This allowed us to locate convergences, modifications, and absences in the Kerala model. We focused on aspects of reform that affect students directly, particularly in terms of credit load, academic mobility, and flexibility of the learning pathway.

Qualitative content analysis was utilized for the coding of prominent themes and patterns in policy texts and curricular documents, thereby ensuring analytical rigour. The study focused on conceptual consistency, internal alignment, and practical feasibility rather than comparison of institutional performance. A triangulation of national, state, and institutional documents enhanced validity but constrained transparency through a reliance on late publicly available and officially notified documents only. The methodology therefore allows for an evaluation of policy implementation from an objective academic perspective that is based on students.

Conceptual Note: NEP 2020 and the FYUGP Framework

NEP 2020 has enunciated a complete paradigm shift in higher education, wherein undergraduate learning is not perceived as a linear accumulation of disciplinary content but a flexible, multidisciplinary, and competency-driven process. Fundamentally rooted in the principles of academic flexibility, learner autonomy, outcome-based education, and credit mobility under national mechanisms such as the National Credit Framework and the Academic Bank of Credits, NEP 2020 pushes the envelope to foster a more equitable and high-quality higher education system, accessible to all who aspire to pursue it. Undergraduate education is envisioned in the policy as a modular learning ecosystem in which students can tailor themselves unique academic pathways via flexible entry and exit points, combinations of study across disciplines, and the recognition of alternative forms of learning. Knowledge, skills, values, and civic capacities are presented as interdependent outcomes, thereby reinforcing the notion that higher education should prepare graduates for a complex future filled with social, economic, and democratic challenges.

The Four Year Under Graduate Programme (FYUGP) is the primary structural tool through which these policy aspirations are implemented at the institutional level. FYUGP can be understood conceptually as an increase in time and area of undergraduate education to achieve discipline specific depth, research orientation, skill development, and value-based learning as part of a common programme architecture. It focuses on implementing different levels of coursework, continuous evaluation, and

aligning all outcomes with the overall goal of comprehensive student development. Though FYUGP is presented as a contextually adaptable framework, its conceptual underpinnings are still heavily interlinked with NEP 2020 (in terms of credit-based progression, modular curricular structure, competency-based learning outcomes, etc.). Policymaking vision and institutional adaptability thus become a key area in which the importance and coherence of reform can be measured. The results discussed in the next section builds upon the conceptual matrix of NEP 2020 and FYUGP framework to see how these policy principles find reflections in curricular structures, credit systems, and academic pathways.

Results

This examination hones in on aspects of

reform that are operational in nature and which affect students directly - programme structure, credit, progression, and the capacity for interdisciplinary study. The findings shed light on to what extent the flexibility and learner autonomy aspired for within relevant policy documents are achieved in the undergraduate model that has been implemented, through an empirical examination of these elements.

5.1. Programme Architecture and Structural Alignment with NEP 2020

The first dimension of analysis examines the structural design of the FYUGP framework in relation to the core architectural principles articulated in NEP 2020. Particular attention is paid to programme duration, progression logic, credit volume, and formal flexibility mechanisms.

Table-1: Structural Features of NEP 2020 and FYUGP Implementation in Kerala

Structural Dimension	NEP 2020 Policy Intent	FYUGP Operational Design (Kerala)	Observed Alignment
Programme Duration	Flexible 3 –4-year UG pathway	Quasi-mandatory 4-year structure	Partial
Total Credit Load	120–160 credits (indicative)	177 credits	Low
Progression Logic	Modular, learner-paced	Fixed semester sequencing	Not fully adopted
Entry–Exit Points	Multiple exits (Year 1, 2, 3, 4)	Exit permitted only after Semester 6	Low
Curriculum Modularity	High	Moderate	Partial

The structural comparison between NEP 2020 and the implementation of FYUGP in Kerala indicates a selective rather than systematic alignment when viewed from a learner-centred pedagogical perspective.

Though comparing to the four-year undergraduate structure formally as proposed under NEP 2020, the transition from a flexible 3-4-year pathway into a simple 4-year programme is a substantial reduction of the

instrument of student choice anticipated. However, this rigidity is amplified when looking next to the increased total credit heading. Over the indicative national range of credits, a student is meant to take in a year - 120 to 148 - through prescribing 177 credits on the FYUGP an academic load is compounded that has consequences for the ease a student can pace, think and learn, work, and for first in family and lower SES students, especially, for the number of paid days they can work.

This tension between the impetus behind a policy and the way it is designed, in the form of progression logic embedded in the FYUGP, is further illustrated below. While NEP 2020 envisions undergraduate education to be modular and learner-driven allowing individual freedom for students to design their academic pathways, there is a rigid semester-wise sequencing in the FYUGP, which restricts academic mobility. This type of structuring limits the practical manifestation of modularity, rendering it a mere descriptor of the curriculum rather than an enabling device. This divergence shows itself most prominently in the handling of multiple entry-exit options. While NEP 2020 recognises the need for exit at the end of every academic year, the manner in which the exit is being implemented by only allowing partial learning to be recognised after completion of the sixth semester significantly delays recognition of leave after each academic year and also counters the rationale of inclusivity that the policy sought to achieve. The exit option also

undermines the ability of the programme to accommodate interrupted learning paths or alternative career paths.

In topology-based grouping, while curriculum modularity in this vertical is institutionally present through differentiated course categories, it remains moderate at best in practice with limited recombination and re-sequencing scope. The lack of completely modular independence indicates that the curricular framework emphasizes administrative coherence over learner flexibility. Lastly, these structural features suggest that while operationalizing the language of NEP 2020, the FYUGP did not internalize the learner centric philosophy of NEP 2020. What emerges from this framework is astonishingly cautious in its reform visibility, even as it challenges others to make uncomfortable institutional changes, rooting these reforms in core policy principles that over time become increasingly more ambiguous such as "freedom of movement," "higher education mobility," or "access," thus resulting in more of a balanced approach to mobilization but ultimately leaving the contours of one of this policy platform blurry in over-elaborate reinterpretations.

Credit Architecture and Academic Load Distribution

This segment analyses the internal credit architecture of FYUGP to assess how credits are distributed across course categories and how this affects learner workload and academic mobility.

Table-2: Credit Distribution Pattern under FYUGP

Course Category	Credit Range per Course	Frequency	Functional Role
Core Disciplinary Courses	4	High	Knowledge consolidation
Interdisciplinary Courses	3	Moderate	Exposure-based learning
Skill-based Courses	3	Limited	Applied competencies
Value-based Courses	3	Minimal	Ethical orientation
Two-credit Modular Courses	Not included	Absent	—

The credit architecture of Kerala's FYUGP reflects a structurally imbalanced distribution that prioritizes disciplinary consolidation over modular flexibility and learner mobility. The predominance of high-credit core discipline specific courses and electives concentrates academic weight within fixed subject boundaries, intensifying semester-wise workload and limiting opportunities for adaptive pacing. Interdisciplinary and skill-oriented courses, while formally incorporated, occupy a comparatively marginal credit space, positioning them as supplementary rather than integrative components of the undergraduate experience. The minimal allocation to value-based courses further signals a symbolic rather than substantive engagement with ethical and civic learning outcomes. Most notably, the complete absence of two-credit modular

courses eliminates a critical mechanism envisioned for academic customization, micro-learning, and credit portability. In short, this credit configuration constrains horizontal mobility, restricts experimentation across domains, and reinforces a linear academic progression that undermines the flexibility and learner agency central to contemporary higher education frameworks. The absence of two-credit modular courses constrains micro-learning opportunities and limits academic experimentation.

Academic Flexibility and Entry-Exit Realization

This segment evaluates how far the formal provisions for flexibility translate into real academic choices for students, particularly regarding exit pathways and re-entry.

Table-3: Entry-Exit Mechanisms: Policy vs Practice

Exit Level	NEP 2020 Provision	FYUGP Availability	Functional Accessibility
Certificate (Year 1)	Yes	No	Absent
Diploma (Year 2)	Yes	No	Absent
Degree (Year 3)	Yes	Conditional	Limited
Honours/Research (Year 4)	Yes	Yes	Conditional

The apparent flexibility of entry exit architecture envisaged under FYUGP is however likely to be reduced to a structurally bounded provision that lowers a policy instrument for academic inclusion into a structurally bound policy instrument. Zero exits at the certificate and diploma level means no early-stage recognition of learning at all, which harms students who do not follow a linear educational path or have had their education interrupted. An exit after the 3rd year is available only on condition and thus further narrows the functional value of partial completion and weakens this beneficial role of exit options in reducing academic loss from dropout. The honours or research

pathway in the fourth year continues to exist formally but the conditionality of this pathway means progression becomes a compliance exercise rather than an academic continuum based on choice. In essence, the narrow instrumentalization of the entry-exit mechanisms dampens mobility among academics, erodes learner security, and substantially drifts away from the inclusive and flexible progression logic underpinning NEP 2020.

Interdisciplinary Integration and Scope Expansion

This segment assesses the depth and positioning of interdisciplinary learning within FYUGP curricula.

Table-4: Modes of Interdisciplinary Integration

Dimension	NEP 2020 Expectation	FYUGP Practice	Depth of Integration
Core-level integration	Encouraged	Minimal	Low
Elective-based interdisciplinarity	Strong	Moderate	Medium
Credit portability across disciplines	High	Limited	Low
Interdisciplinary progression pathways	Enabled	Fragmented	Low

The pattern of interdisciplinary integration under FYUGP suggests an incorporation of interdisciplinarity only in peripheral terms as opposed to embedding of embodiment of the same in core academic structure. Elective-based interdisciplinarity is moderately evident. However, it exists mainly outside core disciplinary pathways and lacks the potential for significant transformation of conceptual foundations or methodological strategies. The limited integration at the core level further entrenches disciplinary silos and limits the multi-disciplinary learning that NEP 2020 envisages. This is compounded by the

limited credit portability because structural barriers constrain the ability of learning to transfer over a disciplinary boundary. The fragmented nature of progression pathways in interdisciplinary studies indicates that interdisciplinarity operates more as a series of episodic experiences rather than a structured academic journey. Together, these patterns suggest that interdisciplinarity under FYUGP is more additive than integrative, failing to produce the type of deep curricular reorientation that is necessary to tackle the complex, real-world problems which are increasingly the focus of higher education.

Table 5: Credit Transfer and Academic Bank Implementation

Parameter	Policy Framework	FYUGP Status	Operational Strength
Credit registration	Digital	Enabled	Moderate
Inter-university credit transfer	Permitted	Rare	Weak
Recognition of external learning	Encouraged	Inconsistent	Weak
Student awareness and usability	High expectation	Low	Weak

The initiation of credit transfer mechanisms under FYUGP reveals a huge difference between the intent within policy documents and actual implementation on the ground. Though digital credit registration is set up in theory, it has only mild functional strength and as such is not being integrated into regular academic planning. The limited success of credit transfer from one institution to another seems to indicate that institutional and procedural barriers to academic mobility remain. Along with the ambiguous categorisation of what constitutes recognised and credentialed prior learning, this further undermines the Academic Bank framework as a true catalyst for flexible and relevant learning pathways. With student ignorance and usability at rock-bottom levels, these structural limitations leave credit transfer mechanisms far more aspirational than actual. These patterns, in combination, indicate that the Academic Bank functions less as a tool for learner autonomy and curricular flexibility and more as an administrative junkyard.

As indicated in the final analysis of policy intent and observed student-centred outcomes, a persistent pattern of high-impact gaps surrounds core reform objectives. To explicate, academic flexibility—the abstraction which one would consider as greater learner autonomy—

is implemented through program designs which prohibit individual pathways to academic progress, as they are ultimately imposed by structure. In a like manner, procedural obstacles to credit transfer hinder the much-desired policy objective of credit mobility, restricting unobstructed transferability of credits by institution and program. Marginal exposure to Interdisciplinarity, interestingly, has only partially realized the ethos of ID giving rise to a systematic but harmful displace between Purpose and Practice by failing to engender knowledge integration within a moderate scope. The total lack of modular learning and micro-credentialing marks a serious departure from policy visions, removing scaffolding meant to facilitate small, personalized, and deliberate learning. Key among these are the reforms that intended to reduce academic burden, which ended up imposing a greater workload, indicating that the priority of learner-centred has been turned into reverse. Together, these gaps assert that the transfer of policy aspirations to practice is more about the structural fit than structural fidelity to educational ends, and they thus undermine the student-centered spirit of much contemporary reform of American higher education.

Discussion of the Findings

The results suggest a fundamental tension between imaginative policy and the institutional capacity for execution in modern higher education. Although the reform framework uses the language of flexibility, interdisciplinarity, and learner autonomy, its operative logic is still grounded in centralised authority and administrative homogeneity. This divide implies that reform has largely been understood as a structural approach instead of as a pedagogical reframing that originates from student experience. Then, what are mechanisms that aim to create more choice and mobility but do so within such rigid frames that their capacity to transform is extremely limited?

This relentless verticality and density is both a symptom of and testament to a fundamental insecurity about content, a content-security mindset in which coverage and standardization trump cognitive complexity and experientially-rich, adaptive learning. These risks recreating outmoded academic power structures under a new brand, with interdisciplinarity and modularity tacked on in a patchwork fashion. The marginalizing of skill-/value-based/low-credit courses is further evidence that an unresolved hierarchy of knowledge exists that continues to favour epistemic accumulation over integrative competence.

Similarly, the limited operationalization of entry-exit options and credit transfer mechanisms raises equity and inclusiveness issues too. Flexible progression routes are most impactful for students with non-linear, patchy education histories, and the lack of these pathways therefore only transfers risk from the system to the individual. In turn, this has implications for retention, mental health,

and sustained engagement with higher education, especially in diverse social contexts.

On a larger scale, the pattern is one of careful responsiveness to national reform agendas tempered by fears of institutional stability and academic agency. This caution may result in greater administrative coherence, but it constrains the system's responsiveness to the pluralisation of learning needs that should be met by higher education today. So, the challenge is not in articulating policies, but in rethinking governance, curriculum and assessment practices that do centre learners and do not compromise on academic standards.

Conclusion

The critical examination of Kerala's Four-Year Undergraduate Programme, situated within the broader architecture of the National Education Policy 2020 and the National Credit Framework, reveals a fundamental disjunction between reform aspirations and institutional enactment. While the formal design of the programme adopts the vocabulary and structural markers of flexibility, interdisciplinarity, and learner autonomy, its operational configuration produces constrained academic pathways characterized by elevated credit loads, restricted exit options, and limited credit mobility. These structural features collectively reconfigure flexibility as a procedural promise rather than a lived academic reality.

From a student-centred perspective, the findings underscore that the efficacy of undergraduate reform cannot be assessed solely through policy alignment or curricular expansion. Instead, meaningful reform depends on the functional accessibility of

choices embedded within programme design. The persistence of tightly sequenced progression, the marginal presence of modular learning units, and the weak operationalization of credit transfer mechanisms suggest that institutional stability has been prioritized over adaptive learning trajectories. Such configurations risk intensifying academic burden while simultaneously narrowing the protective and inclusive capacities that contemporary higher education frameworks seek to promote.

At a conceptual level, the study reinforces the importance of coherence between curriculum theory, credit architecture, and assessment logic. Reforms that expand programme duration and interdisciplinary exposure without recalibrating workload distribution and exit functionality may inadvertently reproduce traditional academic hierarchies under reformist terminology. The analysis thus contributes to broader debates on curriculum complexity by demonstrating how superstructural reform, in the absence of micro-level flexibility, limits the transformative potential of policy-led change.

The study also carries implications beyond the regional context. Kerala's experience illustrates a broader challenge faced by higher education systems seeking to domesticate global policy frameworks: the tendency to translate normative ideals into administratively manageable structures rather than learner-responsive ecosystems. This tension highlights the need for policy evaluation frameworks that foreground student navigation, credit usability, and experiential coherence as core indicators of reform success.

Future research must move beyond regulatory analysis to incorporate longitudinal student data, institutional ethnographies, and comparative studies across states and disciplines. Such inquiry is essential to assess whether contemporary undergraduate reforms genuinely enhance academic agency, equity, and intellectual engagement or whether they consolidate new forms of rigidity within ostensibly flexible systems. Addressing these questions is critical for ensuring that higher education reform advances not only structural modernization but also its foundational educative purpose.

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