EMPOWERING FUTURES: THE ROLE OF INDIAN GOVERNMENT SCHEMES IN ADVANCING GIRL CHILD EDUCATION AND DIGITAL LITERACY

Manmohan Chaudhry[1], Shikha Dutt Sharma[2], Nikhat Mushir[3]

[1]Manmohan Chaudhry, School of Management & Commerce, K.R. Mangalam University, Gurgaon, Haryana
[2]Shikha Dutt Sharma, School of Liberal Arts, K.R. Mangalam University, Gurgaon, Haryana
[3]Nikhat Mushir, faculty of Commerce and Management, Shaheed Guru Gobind Singh Tricentenary (SGT)University, Gurgaon, Haryana

manmohan.chaudhry@krmangalam.edu.in[1]
shikhadutt.sharma@krmangalam.edu.in [2]
nikhat_fcam@sgtuniversity.org[3]

Abstract
Education is a fundamental tool for societal progress, yet the gender gap in educational attainment continues to be a challenge, especially in rural areas. As per recent statistics, the female literacy rate in India is approximately 70.3%, compared to the male literacy rate of 84.7% (Census 2011). Especially rural areas face a larger gender gap in literacy rates due to socio-economic barriers. Economic Constraints, Cultural and Social Norms, Infrastructure Deficits, Safety Concerns being the important ones. Recognizing this, the Indian government has implemented numerous schemes like Beti Bachao Beti Padhao, Digital India, and Kasturba Gandhi Balika Vidyalaya which aims at promoting girl child education and fostering digital literacy.
This study examines the impact of these initiatives, focusing on their role in empowering girl child to overcome socio-economic barriers and embrace educational opportunities. This study also explores parental attitudes, community participation, and infrastructural improvements that contribute to the success of these programs. The study will explore the role of digital information dissemination among students in rural areas. Some studies indicated a significant increase in enrolment rates, retention, and digital literacy levels among girls, leading to better career prospects and societal inclusion. It highlights the transformative potential of integrating gender-focused educational policies with digital empowerment in bridging the gap between traditional challenges and modern opportunities. This paper contributes to the discourse on digital literacy and girl child development by providing insights into the intersection of government policies, education, and technology, advocating for strengthened strategies to reduce digital and gender inequities in India.

Keywords: Digital literacy, Gender Inequity, Empowerment, Government Schemes, Literacy Rate

1.Introduction

In the evolving landscape of global development, education and digital literacy are universally acknowledged as transformative tools for empowering marginalized populations, particularly the girl child. In India, where gender disparities in education and technological access remain pervasive, these dimensions are central to national goals such as Viksit Bharat@2047 and the United Nations Sustainable Development Goals, specifically SDG 4 (quality education) and SDG 5 (gender equality) (NITI Aayog, 2021). Education for girls is not only a means of fostering individual agency and socio-economic mobility, but also a strategic investment for national progress. In the digital age, digital literacy is equally essential, equipping girls with the skills needed to participate meaningfully in a knowledge-driven economy (Mukherjee, 2022; Kumar & Rani, 2022).

In response to these imperatives, the Government of India has implemented several flagship programs—Beti Bachao Beti Padhao (BBBP), Samagra Shiksha Abhiyan, Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), and Digital India, among others—designed to advance girls' education and bridge the gender digital divide (Kundu & Dutta, 2020; Sharma & Agarwal, 2021). These schemes aim to provide financial support, enhance

digital infrastructure, promote digital literacy, and generate awareness among families. While notable progress has been made in increasing female enrollment and literacy rates, the effectiveness of these interventions in cultivating sustained digital competencies among girls—especially in rural regions—remains underexplored (Singh & Verma, 2020; Verma & Rathi, 2023).

Persistent challenges such as socio-cultural resistance, technological inaccessibility, insufficient teacher training, and limited parental engagement continue to restrict the full realization of these schemes' intended outcomes (Kapoor & Choudhary, 2021; Rao & Kumar, 2020). To bridge this gap between policy and practice, it is imperative to undertake a nuanced evaluation of these initiatives. This study, therefore, is situated within this context, aiming to assess the effectiveness of Indian government schemes in enhancing digital literacy among girls in rural settings like Sohna Tehsil, Haryana.

Specifically, this research is guided by two primary objectives: (1) to study the impact of Indian government digital literacy schemes on the digital literacy levels among girls; and (2) to examine parents' awareness about these government-led initiatives. By investigating these dimensions, the study not only evaluates policy effectiveness but also identifies critical enablers and barriers influencing digital skill development among girls. This evidence-based inquiry aspires to contribute to the discourse on educational equity, inform policy enhancement, and promote a more inclusive and digitally empowered India.

2.Literature Review

2.1 Government Schemes and Girl Child Education

The Indian government has made substantial efforts to improve girls' access to education through policies such as *Beti Bachao Beti Padhao (BBBP)*, *Sarva Shiksha Abhiyan (SSA)*, and *Samagra Shiksha*. These programs offer financial incentives, scholarships, and conditional cash transfers to families to reduce the gender gap in school enrollment and retention (Kundu & Dutta, 2020). Empirical studies have shown that such schemes significantly improve female enrollment rates in primary and secondary education, particularly in rural areas (Srivastava, 2019). However, despite these efforts, traditional gender norms and safety concerns continue to influence parental decisions, limiting educational attainment for girls beyond the secondary level (Kapoor & Choudhary, 2021).

2.2 Digital Literacy and Gender Disparities

With the onset of the *Digital India* initiative, digital literacy has emerged as a crucial complement to formal education. Programs like *Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA)* and the *National Digital Literacy Mission (NDLM)* aim to equip citizens with basic digital skills. While the digital penetration rate has improved in India, a significant gender digital divide persists. Girls, especially in rural settings, have less access to digital devices and internet facilities, often due to socio-cultural biases and economic constraints (Singh & Verma, 2020). Mukherjee (2022) notes that in many households, male children are prioritized for access to digital tools, which limits digital exposure and learning opportunities for girls.

2.3 Infrastructure and Financial Incentives

Infrastructure plays a foundational role in promoting digital literacy. Research shows that the presence of ICT labs, internet connectivity, and e-learning platforms in schools correlates with improved student engagement and learning outcomes (Rao & Kumar, 2020). Moreover, financial incentives such as free digital devices, scholarships, and subsidized tuition encourage families to invest in girls' digital education (Sharma & Agarwal, 2021). However, Verma and Rathi (2023) argue that such benefits often fail to reach the most marginalized due to weak implementation mechanisms and bureaucratic inefficiencies.

2.4 Role of Teacher Training

The role of educators in delivering digital education is critical. Teachers need to be well-versed in digital pedagogy and educational technologies to facilitate meaningful learning. Yet, many government schools lack access to continuous professional development in digital instruction (Kumar & Rani, 2022). Rao and Kumar (2020) highlight that without adequate training and support, even the best technological infrastructure may fail to deliver intended outcomes. Teacher motivation and competence thus act as a significant mediating factor in the success of digital literacy programs for girls.

2.5 Parental Awareness and Community Involvement

Parental awareness significantly influences girls' participation in educational initiatives. Studies show that when parents understand the long-term benefits of education and digital literacy, they are more likely to support their daughters' schooling and digital engagement (Kapoor & Choudhary, 2021). Community-based sensitization campaigns, led by NGOs and local governance bodies, have proven effective in changing attitudes toward girl child education (Gupta, 2021). However, Sharma (2022) notes that awareness alone may not translate into action unless supported by enabling conditions like financial affordability and cultural openness.

2.6 Gaps in Implementation and Policy Evaluation

While government initiatives are theoretically robust, their practical implementation often lacks consistency and sustainability. Poor monitoring systems, fund misallocation, and the absence of impact evaluation frameworks hinder the long-term effectiveness of schemes targeted at girls' education and digital literacy (NITI Aayog, 2021). There is a growing need for data-driven policy revision and localized strategies to ensure inclusive outreach and better resource utilization.

3. Research Methodology

3.1 Research Objectives

The objectives are to study the impact of Indian government digital literacy schemes on the Digital Literacy   levels among Girl's education and to examine the parents' awareness about the Indian government digital literacy schemes.

3.2 Hypotheses Development The following four hypotheses has been developed for the study:

H1: There is a significant relationship between access to Digital Infrastructure and Girls digital literacy skills

H2: There is a significant relationship between access to financial incentives and Girls digital literacy skills

H3: There is a significant relationship between Teachers training and Girls digital literacy skills

H4: There is a significant relationship between Parent awareness and Girls digital literacy skills
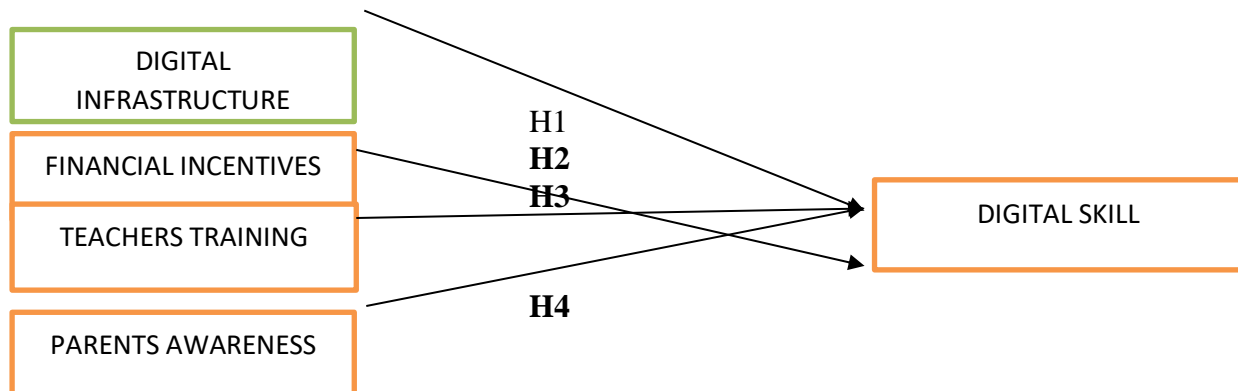
3.3 Conceptual Framework

Fig 1: Conceptual model

3.4 Research Design

The study employs a descriptive research design to assess the impact of government schemes on girl child education in Sohna Tehsil. A structured approach has been used to study impact of Govt schemes for girl child digital education in schools

3.5 Data Collection Methods

Primary data was collected through surveys and structured interviews from four villages in Sohna Tehsil. Respondents included parents and teachers, as they play a crucial role in shaping the educational environment for girls.

3.6 Measurement Variable

Independent variables: Digital Infrastructure (DI), Financial Incentives (FI), Teacher Training (TT), and Parental Awareness (PA)

Dependent Variable: Digital Literacy Skills (DS).

Variables	Measurement Scale	Source
Digital Infrastructure (DI)	5-point Likert	Adapted from International Telecommunication Union (ITU, 2020)
Financial Incentives (FI)	5-point Likert	Adapted from Organisation for Economic Co-operation and Development (OECD, 2019)
Teacher Training (TT)	5-point Likert	Adapted from Guskey, T. R. (2002)
Parental Awareness (PA)	5-point Likert	Adapted from Epstein, J. L. (2011)
Digital Literacy Skills (DS)	5-point Likert	Adapted from United Nations Educational, Scientific and Cultural Organization (UNESCO, 2018)

Table 1: Measurement scale and source of the Variables taken for the study

3.7 Sample Size and Respondents

The study comprises a sample size of 173 respondents, including both parents and teachers, ensuring a balanced perspective on the effectiveness of government schemes.

3.8 Techniques Used

The collected data was analyzed using SPSS. Statistical techniques such as regression analysis and correlation analysis were applied to examine the relationship between

government interventions and improvements in girl child education. These methods helped in identifying key influencing factors and evaluating the effectiveness of policies in enhancing enrollment and retention rates.

3.9 Questionnaire designing

The questionnaire for this study was structured to collect comprehensive data from parents and teachers regarding their attitudes towards the education of girl children after the implementation of government schemes in Sohna Tehsil. It consisted of closed-ended questions, allowing for quantitative analysis.

The questionnaire was divided into two sections:

Section A: Demographic Information – This section gathered basic details about the respondents, such as age, education level and Income to understand their background and its potential influence on their responses.

Section B: Questions in this section assessed respondents' awareness of various government initiatives promoting girl child digital education and their perceptions of the effectiveness of the schemes. The questionnaire was pre-tested with a small sample of 52 respondents from 3 villages of Sohna Tehsil, during which four questions were dropped to enhance clarity and reliability.

4.Data Analysis and Findings

4.1 Demographic Profile

Demographic Category	Frequency
Age of the girl child student	
Less than 10	25
10-12	56
13-15	54
16-18	38
Income of the Parents	
Less than 10000 pm	11
10-20	43
20-30	52
30-40	42
40-50 or more	25
Educational qualification of Father	
Illiterate	12
Primary education	56
Matric	66
Higher secondary education	37
Graduation	2

Table 2: Demographic profile of the Respondents

The table presents demographic data on girl child students, their parents' income levels, and the educational qualifications of their fathers.

Age of the Girl Child Student

The largest group (56 students) falls in the 10-12 age category.The 13-15 age group follows closely with 54 students.The number of students decreases as age increases, with only 25 students under 10 years and 38 students in the 16-18 age category.

Income of the Parents (per month in ₹1000s):

A significant portion of parents earn between ₹20,000-30,000 (52 families).The next highest category is ₹30,000-40,000, with 42 families .Fewer families earn less than ₹10,000 (11 families) or above ₹40,000 (25 families).

Educational Qualification of the Father

The most common educational level is "Matric" (66 fathers).56 fathers have only primary education.37 fathers have completed higher secondary education.A small number of fathers are illiterate (12).Very few fathers (only 2) have completed graduation.

So we can say that most of the girls in the study are between 10-15 years old, indicating active school participation in middle school years. The parents predominantly fall in the middle-income range of ₹20,000-40,000 per month. Fathers of these children mostly have education up to the matriculation level, with very few being graduates.

4.2 Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.815	20

Table 3: Reliability

The table presents Reliability Statistics, specifically Cronbach's Alpha, which measures the internal consistency of a scale or questionnaire. The value (Cronbach's Alpha = 0.815) suggests a high level of reliability (internal consistency). Generally, an alpha value above 0.7 is acceptable, while above 0.8 is considered good. A value of 0.815 indicates that the items in the scale are well-correlated and measure the same underlying construct effectively.

4.3 Correlation

Correlations

		DI	FI	TT	DS	PA
DI	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	173				
FI	Pearson Correlation	.385	1			
	Sig. (2-tailed)	.000				
	N	173	173			
TT	Pearson Correlation	.450	.574	1		
	Sig. (2-tailed)	.000	.000			
	N	173	173	173		
DS	Pearson Correlation	.439	.488	.522	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	173	173	173	173	
PA	Pearson Correlation	.417	.447	.706	.425	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	173	173	173	173	173

Table 4: Pearson Correlation

All variables are positively correlated, indicating that improvements in one factor are associated with improvements in the others. Teachers Training (TT) plays a central role, as it has the highest correlations with PA (0.706), FI (0.574), and DS (0.522). Financial incentives (FI) is also crucial, as it significantly influences Teachers Training (0.574) and Digital literacy Skills (0.488). Since all correlations are statistically significant ($p < 0.05$), these relationships are meaningful and not due to chance.

4.4 Regression

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.173	.260		4.512	.000
	DI	.178	.060	.211	2.988	.003
	FI	.221	.071	.238	3.109	.002
	TT	.229	.087	.254	2.637	.009
	PA1	.039	.068	.051	.575	.566

a. Dependent Variable: DS

Table 5: Regression

Hypothesis	Regression wt.	R Square	F	t-value	P value	Hypotheses supported
H1	DI→DS	.363	23.930	2.988	.003	Yes
H2	FI→DS			3.109	.002	Yes
H3	TT→DS			2.637	.009	Yes
H4	PA→DS			.575	.566	No

Table 6: Hypotheses results

The table presents hypothesis testing results using regression analysis.:

R Square: Represents the proportion of variance in the dependent variable (DS) explained by the independent variable. Higher values indicate a stronger explanatory power. H1 has the highest R^2 value (.363), suggesting DI explains 36.3% of the variance in DS.

F-statistic: Measures overall model significance. All hypotheses except H4 have relatively high F values, indicating statistical significance.

t-value & P-value: A t-value above 2 and a p-value below 0.05 indicate statistical significance. H1 (p = .003), H2 (p = .002), and H3 (p = .009) are significant and support their hypotheses. H4 (p = .566) is not significant, meaning PA does not significantly impact DS.

4.4.1 Hypothesis Support:

H1, H2, and H3 are supported. H4 is not supported due to an insignificant p-value. So the study suggests focusing on DI, FI, and TT as key drivers of DS.

4.4.2 Hypotheses Results

1.H1 (DI → DS)
 t = 2.988, p = 0.003 (< 0.05) → This indicates a statistically significant relationship.
So H1 is supported (Digital Infrastructure positively influences Digital Skills).
2.H2 (FI → DS)
t-value = 3.109, p = 0.002 (< 0.05) shows significance.
H2 is supported (Financial Incentives positively influences Digital Skills).
3. H3 (TT → DS) t-value = 2.637, p = 0.009 (< 0.05) → Statistically significant. So H3 is supported (Teachers Training positively influences Digital Skills).
4.H4 (PA → DS) t-value = 0.575, p = 0.566 (> 0.05) → Not statistically significant. H4 is not supported (Parents awareness does not significantly influence Digital Skills).

DI, FI, and TT significantly contribute to DS (Digital Skills).PA does not significantly impact DS, indicating that Parents awareness alone may not impact Digital Skills development. The strongest predictor appears to be FI (Financial incentives) based on the highest t-value (3.109).

5.Conclusion

The results shows that teacher preparation, financial incentives, and digital infrastructure are essential for improving pupils' digital literacy. While financial incentives promote participation and engagement in digital learning, robust digital infrastructure guarantees the availability and accessibility of digital materials. Teachers who have received teacher training are more prepared to offer digital education.

Parental awareness by itself, however, has little effect on the development of digital abilities, suggesting the need for other supporting mechanisms like community participation and school regulations. All things considered, encouraging digital literacy in kids requires a systematic strategy that combines financial assistance, teacher capacity-building, and digital resources.

These results offer useful information that institutions, educators, and legislators may use to create evidence-based plans for improving digital literacy in the classroom and beyond.

6.Recommendations

It is essential to invest in bolstering digital infrastructure in order to improve the digital literacy of girls, especially in underprivileged and rural regions. In order to provide girls with access to high-quality digital education, schools should be outfitted with contemporary technology tools like e-learning platforms and smart classrooms.By providing scholarships, subsidies, and financial support to girls from economically disadvantaged backgrounds, increasing financial incentives can also help close the digital gap. More girls will be able to actively participate in educational opportunities and acquire critical digital competences if the cost of digital learning is lessened.

Another important factor in promoting digital literacy is teacher preparation. To help teachers use technology in the classroom, regular digital training sessions must to be incorporated into teacher education curriculum. Additionally, parents may assist their children's digital learning at home by raising parental awareness through training sessions and community seminars. With businesses and non-governmental organizations (NGOs) playing a significant role in supporting digital education projects, public-private partnerships may be used to enhance digital learning facilities. Lastly, to ensure ongoing progress in digital education policies and programs for girls, a strong monitoring and evaluation structure should be put in place to gauge the results of these activities.

7.Implications of the Study

This study examines the impact of Digital Infrastructure (DI), Financial Incentives (FI), Teacher Training (TT), and Parental Awareness (PA) on Digital Literacy Skills (DS). The findings provide significant theoretical and practical implications for policymakers, educators, and institutions aiming to enhance digital literacy.

7.1 Theoretical Implications

In line with digital learning theories that stress the significance of technology accessibility in skill development, the study confirms the high correlation between DI and DS and supports the notion that a well-developed digital infrastructure improves digital literacy. Economic theories that contend that financial assistance, such as grants, subsidies, or incentives, enhances digital accessibility and participation are supported by the beneficial effects of FI on DS. Furthermore, as qualified instructors are able to successfully incorporate technology into their pedagogy for more effective digital education, the results validate educational frameworks that emphasize the need of educated educators in the development of digital skills. TT is found to greatly improve DS. However, the lack of significant influence of PA on DS challenges conventional theories that assume parental awareness is a major driver of

digital literacy, suggesting that direct access to technology and school-based interventions may play a more critical role.

7.2 Practical Implications

To improve digital literacy, governments and institutions should make investments in digital infrastructure, such as computer laboratories, internet access, and e-learning platforms. Public-private collaborations may also aid in closing the digital gap, especially in rural regions. To encourage digital learning, particularly for disadvantaged populations, policymakers should provide financial aid programs that include free digital tools, subsidized internet, and scholarships for computer education. Government organizations should incorporate digital pedagogy courses into teacher education programs, and schools should place a high priority on ongoing teacher training programs to guarantee that teachers are knowledgeable about the newest digital teaching techniques. Given that PA does not significantly impact DS, interventions should focus directly on students rather than relying solely on parental engagement, and awareness programs should be refined to facilitate direct digital access for students instead of merely informing parents.

8. Future Research Directions

Future research could explore whether PA indirectly influences DS through variables such as school interventions or socio-economic conditions. Longitudinal studies tracking changes in DS over time can provide deeper insights into how DI, FI, and TT contribute to long-term skill development. Additionally, sector-specific research across different educational levels (primary, secondary, higher education) or professional sectors can help refine digital literacy strategies to better address the unique needs of diverse groups.

References

Gupta, R. (2021). Public-private partnerships in girl child education and digital literacy. *Journal of Social Development, 14*(2), 112–128.

Kapoor, A., & Choudhary, R. (2021). Parental perceptions and cultural barriers in girl child education in rural India. *Journal of Gender and Social Research, 16*(3), 78–94.

Kumar, V., & Rani, S. (2022). Digital literacy programs and women empowerment: A case study of PMKVY. *Indian Journal of Technology and Education, 19*(4), 78–95.

Kundu, A., & Dutta, P. (2020). Impact of Beti Bachao Beti Padhao on female education in India. *Education Policy Review, 17*(3), 45–60.

Mukherjee, S. (2022). Digital learning platforms in India: Opportunities and challenges for girls. *International Journal of Digital Studies, 8*(1), 33–47.

NITI Aayog. (2021). *Integrating digital literacy in Indian schools: Policy recommendations*. Government of India Report.

Rao, P., & Kumar, A. (2020). ICT integration in school education: Barriers and enablers. *Educational Technology and Society, 23*(1), 49–60.

Sharma, M. (2022). Evaluating the grassroots implementation of digital literacy schemes for girls. *Development and Policy Review, 11*(2), 102–120.

Sharma, M., & Agarwal, P. (2021). Financial incentives and their role in reducing dropout rates among girls. *Economic and Educational Research, 10*(2), 23–40.

Singh, R., & Verma, N. (2020). The gender digital divide: Barriers to digital education for girls. *Journal of Gender Studies, 15*(1), 88–103.

Srivastava, T. (2019). The role of SSA and RMSA in promoting girl child education. *Indian Journal of Education Policy, 12*(4), 55–72.

Verma, A., & Rathi, R. (2023). Assessing the impact of Skill India and NDLM on digital empowerment. *Indian Journal of Public Administration, 24*(2), 67–81.